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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 Offshore and Ocean Technology

Date of first publication/latest revision:	08/09/16 – July 2017

1. What is the course?

Course information

Course Title	Offshore and Ocean Technology
Course code	**MSc, PgDip, PgCert OOT with Risk Management** (MSORMFTC, MSORMPTC, PDORMFTC, PDORMPTC, PCORMFTC, PCORMPTC) **MSc, PgDip, PgCert OOT with Offshore Materials Engineering** MSOMEFTC, MSOMEPTC, PDOMEFTC, PDOMEPTC, PCOMEFTC, PCOMEPTC) **MSc, PgDip, PgCert OOT with Offshore Renewable Energy** (MSOREFTC, MSOREPTC, PDOREFTC, PDOREPTC, PCOREFTC, PCOREPTC) **MSc, PgDip, PgCert OOT with Pipeline Engineering** (MSOPEFTC, MSOPEPTC, PDOPEFTC, PDOPEPTC, PCOPEFTC, PCOPEPTC) **MSc, PgDip, PgCert OOT with Subsea Engineering** (MSOSEFTC, MSOSEPTC, PDOSEFTC, PDOSEPTC, PCOSEFTC, PCOSEPTC)
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 and Power
Centre	Centre for Oil and Gas Engineering
Programme Director **Course Director**	Dr Gill Drew Dr Maurizo Collu (Course Director) Dr Joy Sumner and Dr Patrick Verdin (Deputy Course Directors)
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No

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

Offshore and Ocean Technology Programme COURSE SPECIFICATION
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Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Full-time MSc, PgDip, PgCert: 1 year Part-time MSc: Up to 3 years Part-time PgDip and PgCert: 2 years
Course Start Month(s)	October

Institutions delivering the course
This course is delivered by the Energy and Power these where the research interests include corrosion, project management, offshore inspection, safety risk and reliability offshore, materials in the offshore environment, structural integrity, stress analysis, marine renewable energy. Cranfield University interacts with the following institutions in the following ways:

The programme does not have any formal academic or industrial partners. Some full-time students may undertake their individual project whilst placed within a company or other institution either in the UK or abroad. The course takes advantage of EU Erasmus funding to provide such opportunities in Europe for suitable students. Many students will undertake their individual project and group project in close collaboration with a company whilst remaining on campus.

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is currently accredited by the Institute of Mechanical Engineers (IMechE) until 2019.

2. **What are the aims of the course?**

Cranfield University offers this course in order to:

- To address UK and global shortage of Offshore and Ocean Engineers
- To supply the offshore and offshore renewable energy industries addressed by the course with personnel having the knowledge and skills required to work at a professional level safely and effectively in this environment
- To be regarded as a major contributor in education and training in the global offshore and offshore renewable energy sector
- To keep in close contact with the offshore and offshore renewable energy industries through collaborating companies and its alumni and in doing so identify research opportunities in this field.

This programme is intended for the following range of students:

- New graduates with an engineering or science background (dependent upon option chosen)

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

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- Experienced professionals working within the offshore industries who wish to further their careers within their field.
- Experienced professionals working in other industries who wish to find employment in an offshore industry that is addressed by this course.

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

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

A. Postgraduate Certificate in Offshore and Ocean Technology

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

ILO 1. Explain the technologies employed within the offshore oil & gas and offshore renewable energy industrial sector addressed by the course followed.

ILO 2. Identify advanced technology, management and environmental issues to enable the development of solutions for international industries and/or research organisations within the offshore industry.

ILO 3. Plan and undertake a feasibility/design study or a short piece of research work related to offshore oil & gas or offshore renewable energy technologies and management, and present the work in the form of a written report or as part of an exam.

ILO 4. Evaluate current research to develop solutions for issues related to offshore oil & gas and offshore renewable energy industries.

B. Postgraduate Diploma in Offshore and Ocean Technology

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

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

C. MSc

In 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?

The course has been developed, and is delivered, by leading academics in the field of offshore and offshore renewable energies. Students have access to some of the technical facilities at Cranfield University.

The taught modules vary in style from traditional lectures for subject based learning to practical sessions with a more problem based learning style. The different teaching styles are designed to address the need for different learning styles, in an attempt to reduce gender bias and increase appeal to mid-career change applicants. The course embraces diversity and provides equality of opportunity to all learners.

The group project work for PgDip and MSc students provides a framework for the development of acquired skills in terms of analysis, presentations, report writing, team working, project management and the use, and/or development, of offshore and offshore renewable energy technologies.

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

• The provision of a comprehensive set of course notes
• The use of Blackboard, a virtual learning environment
• Face-to-face meetings with the Course Tutors and members of the Course Team as required
• The Course Tutor, who is the student's main point of contact prior to the course and in the early stages of the course, and supports the student throughout the course
• The Course Administrator, who supports the student throughout the course regarding any administrative matter
• The module leaders, who are available to support the technical content of the taught modules and discuss the assessment of each module
• Course lecturers, who are the primary contact for students on individual lecture content
• The Group Project Supervisor, who provides direction and supervision throughout the duration of the Group Project and its assessment
• The Individual Project Supervisor, who provides direction and personal supervision to a student throughout their MSc project and its assessments

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

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

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

A. Postgraduate Certificate in Offshore and Ocean Technology with Risk Management
The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction	0
Subsea Oil and Gas Exploitation	10

Description	Credits
Safety, Risk and Reliability Offshore	10
Offshore Inspection	10
Corrosion in the Offshore Environment	10
Reliability Engineering and Asset Risk Management	10
Management for Technology	10
ELECTIVE MODULES:	
N/A	
TOTAL:	**60**

B. Postgraduate Diploma in Offshore and Ocean Technology with Risk Management
The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction	0
Subsea Oil and Gas Exploitation	10
Safety, Risk and Reliability Offshore	10
Offshore Inspection	10
Corrosion in the Offshore Environment	10
Reliability Engineering and Asset Risk Management	10
Management for Technology	10
Group Project	40
ELECTIVE MODULES:	
2 modules from:	
Offshore Renewable Energy – Technology	10
Materials in the Offshore Environment	10
Structural Integrity	10
Engineering Stress Analysis: Theory and Simulations	10
Offshore Pipeline Design and Installation	10
Part Time Students:	
Group Project	40
OR	
Dissertation	40
TOTAL:	**120**

C. MSc in Offshore and Ocean Technology with Risk Management
In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
COMPULSORY MODULES:	
Induction	0
Subsea Oil and Gas Exploitation	10

Description	Credits
Safety, Risk and Reliability Offshore	10
Offshore Inspection	10
Corrosion in the Offshore Environment	10
Reliability Engineering and Asset Risk Management	10
Management for Technology	10
Group Project	40
Individual Thesis Project	80
ELECTIVE MODULES:	
2 modules from:	
Offshore Renewable Energy – Technology	10
Materials in the Offshore Environment	10
Structural Integrity	10
Engineering Stress Analysis: Theory and Simulations	10
Offshore Pipeline Design and Installation	10
Part Time Students:	
Group Project	40
OR	
Dissertation	40
TOTAL:	**200**

D. Postgraduate Certificate in Offshore and Ocean Technology with Offshore Materials Engineering

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

Description	Credits
COMPULSORY MODULES:	
Induction	0
Materials in the Offshore Environment	10
Safety, Risk and Reliability Offshore	10
Offshore Inspection	10
Structural Integrity	10
Corrosion in the Offshore Environment	10
Management for Technology	10
ELECTIVE MODULES:	
N/A	
TOTAL:	**60**

E. Postgraduate Diploma in Offshore and Ocean Technology with Offshore Materials Engineering

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

Description	Credits
COMPULSORY MODULES:	

Induction	0
Materials in the Offshore Environment	10
Safety, Risk and Reliability Offshore	10
Offshore Inspection	10
Structural Integrity	10
Corrosion in the Offshore Environment	10
Management for Technology	10
Group Project	
	40
ELECTIVE MODULES:	
2 modules from:	
Offshore Renewable Energy – Technology	10
Subsea Oil and Gas Exploitation	10
Engineering Stress Analysis: Theory and Simulations	10
Reliability Engineering and Asset Risk Management	10
Offshore Pipeline Design and Installation	10
Part Time Students:	
Group Project	40
OR	
Dissertation	40
TOTAL:	**120**

F. MSc in Offshore and Ocean Technology with Offshore Materials Engineering

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
Materials in the Offshore Environment	10
Safety, Risk and Reliability Offshore	10
Offshore Inspection	10
Structural Integrity	10
Corrosion in the Offshore Environment	10
Management for Technology	10
Group Project	40
Individual Thesis Project	80
ELECTIVE MODULES:	
2 modules from:	
Offshore Renewable Energy – Technology	10
Subsea Oil and Gas Exploitation	10
Engineering Stress Analysis: Theory and Simulations	10
Reliability Engineering and Asset Risk Management	10
Offshore Pipeline Design and Installation	10

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

G. Postgraduate Certificate in Offshore and Ocean Technology with Offshore Renewable Energy

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

Description	Credits
COMPULSORY MODULES:	
Induction	0
Offshore Renewable Energy – Technology	10
Materials in the Offshore Environment	10
Safety, Risk and Reliability Offshore	10
Offshore Inspection	10
Corrosion in the Offshore Environment	10
Management for Technology	10
ELECTIVE MODULES:	
N/A	
TOTAL:	**60**

H. Postgraduate Diploma in Offshore and Ocean Technology with Offshore Renewable Energy

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

Description	Credits
COMPULSORY MODULES:	
Induction	0
Offshore Renewable Energy – Technology	
Materials in the Offshore Environment	10
Safety, Risk and Reliability Offshore	10
Offshore Inspection	10
Corrosion in the Offshore Environment	10
Management for Technology	10
Group Project	10
	40
ELECTIVE MODULES:	
2 modules from:	
Subsea Oil and Gas Exploitation	10
Structural Integrity	10
Engineering Stress Analysis: Theory and Simulations	10
Reliability Engineering and Asset Risk Management	10
Offshore Pipeline Design and Installation	10

Offshore and Ocean Technology Programme COURSE SPECIFICATION

Description	Credits
Part Time Students: Group Project OR Dissertation	40 40
TOTAL:	**120**

I. MSc in Offshore and Ocean Technology with Offshore Renewable Energy

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 Offshore Renewable Energy – Technology Materials in the Offshore Environment Safety, Risk and Reliability Offshore Offshore Inspection Corrosion in the Offshore Environment Management for Technology Group Project Individual Thesis Project	0 10 10 10 10 10 10 40 80
ELECTIVE MODULES:	
2 modules from: Subsea Oil and Gas Exploitation Structural Integrity Engineering Stress Analysis: Theory and Simulations Reliability Engineering and Asset Risk Management Offshore Pipeline Design and Installation Part Time Students: Group Project OR Dissertation	 10 10 10 10 10 40 40
TOTAL:	**200**

J. Postgraduate Certificate in Offshore and Ocean Technology with Pipeline Engineering

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

Description	Credits
COMPULSORY MODULES:	
Induction	0
Materials in the Offshore Environment Safety, Risk and Reliability Offshore	10 10

Description	Credits
Offshore Inspection	10
Corrosion in the Offshore Environment	10
Offshore Pipeline Design and Installation	10
Management for Technology	10
ELECTIVE MODULES:	
N/A	
TOTAL:	**60**

K. Postgraduate Diploma in Offshore and Ocean Technology with Pipeline Engineering

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

Description	Credits
COMPULSORY MODULES:	
Induction	0
Materials in the Offshore Environment	10
Safety, Risk and Reliability Offshore	10
Offshore Inspection	10
Corrosion in the Offshore Environment	10
Offshore Pipeline Design and Installation	10
Management for Technology	10
Group Project	40
ELECTIVE MODULES:	
2 modules from:	
Offshore Renewable Energy –Technology	10
Subsea Oil and Gas Exploitation	10
Structural Integrity	10
Engineering Stress Analysis: Theory and Simulations	10
Reliability Engineering and Asset Risk Management	10
Part Time Students:	
Group Project	40
OR	
Dissertation	40
TOTAL:	**120**

L. MSc in Offshore and Ocean Technology with Pipeline Engineering

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:	

Offshore and Ocean Technology Programme COURSE SPECIFICATION

Induction	0
Materials in the Offshore Environment	10
Safety, Risk and Reliability Offshore	10
Offshore Inspection	10
Corrosion in the Offshore Environment	10
Offshore Pipeline Design and Installation	10
Management for Technology	10
Group Project	40
Individual Thesis Project	80
ELECTIVE MODULES:	
2 modules from:	
Offshore Renewable Energy –Technology	10
Subsea Oil and Gas Exploitation	10
Structural Integrity	10
Engineering Stress Analysis: Theory and Simulations	10
Reliability Engineering and Asset Risk Management	10
Part Time Students:	
Group Project	40
OR	
Dissertation	40
TOTAL:	**200**

M. Postgraduate Certificate in Offshore and Ocean Technology with Subsea Engineering
The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction	0
Materials in the Offshore Environment	10
Subsea Oil and Gas Exploitation	10
Safety, Risk and Reliability Offshore	10
Offshore Inspection	10
Corrosion in the Offshore Environment	10
Management for Technology	10
ELECTIVE MODULES:	
N/A	
TOTAL:	**60**

N. Postgraduate Diploma in Offshore and Ocean Technology with Subsea Engineering
The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction	0
Materials in the Offshore Environment	10
Subsea Oil and Gas Exploitation	10
Safety, Risk and Reliability Offshore	10
Offshore Inspection	10
Corrosion in the Offshore Environment	10
Management for Technology	10
Group Project	40
ELECTIVE MODULES:	
2 modules from:	
Offshore Renewable Energy –Technology	10
Structural Integrity	10
Engineering Stress Analysis: Theory and Simulations	10
Reliability Engineering and Asset Risk Management	10
Offshore Pipeline Design and Installation	10
Part Time Students:	
Group Project	40
OR	
Dissertation	40
TOTAL:	**120**

O. MSc in Offshore and Ocean Technology with Subsea Engineering
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
Materials in the Offshore Environment	10
Subsea Oil and Gas Exploitation	10
Safety, Risk and Reliability Offshore	10
Offshore Inspection	10
Corrosion in the Offshore Environment	10
Management for Technology	10
Group Project	40
Individual Thesis Project	80
ELECTIVE MODULES:	
2 modules from:	
Offshore Renewable Energy –Technology	10
Structural Integrity	10
Engineering Stress Analysis: Theory and Simulations	10

Reliability Engineering and Asset Risk Management	10
Offshore Pipeline Design and Installation	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 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?**

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[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%).

Full-time students register for the course in early October and are expected to complete the course by a date specified in the following September.

This course is also offered on a part-time basis. Students are expected to complete the course over a two, three or, exceptionally, a four year period.

The course comprises three elements:-

- **Coursework** – the taught element which is given as a series of one-week modules. Students are required to complete 8 modules. The 6 of these modules are determined by the option within the course that is followed. The remaining 2 modules are chosen by the student. The modules comprise lectures, tutorials, case studies, laboratory demonstrations, and workshop exercises in varying proportions as appropriate. The modules are scheduled during the period October to February. Students are expected to spend additional time over and above the contact hours within the week of the module.
- For full-time students, a Group Project, in which groups of typically 4 to 8 students work as a team on a multi-disciplinary problem of industrial relevance.
- Part time students are required to complete a dissertation that is concerned with a module of their choice following consultation with the Course Director.
- Individual MSc Projects can begin at any time during the course, depending on project content and the involvement with participating companies. However the individual project activities reach their peak during May to August. Individual Project assessments take place in September.

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 week	G Drew	24		0	Y		02/10/17	06/10/17	N/A	AO	N/A				N/A	
2	I-OOT-A1081	Offshore Renewable Energy – Technology	F Kara	32		10	Y		09/10/17	13/10/17	40	EX	100				w/c 11/12/17	10-14 Sept 18
3	I-OOT-A1078	Materials in the Offshore Environment	J Sumner	32		10	Y		16/10/17	20/10/17	40	EX	100				w/c 02/01/18	10-14 Sept 18
4	I-OOT-A1079	Offshore Inspection	M Shafiee	32		10	Y		23/10/17	27/10/17	40	ICW	100				FT 04/11/17 PT 18/11/17	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.

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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
5	I-OOT-A1085	Subsea oil and Gas Exploitation	F Kara	32		10	Y		06/11/17	10/11/17	40	EX	100				w/c 11/12/17	10-14 Sept 18
6	I-OOT-A1084	Safety, Risk and Reliability Offshore	M Shafiee	32		10	Y		13/11/17	17/11/17	40	EX	100				w/c 11/12/17	10-14 Sept 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 02/01/18 PT 13/01/18	July 18
8	I-OOT-A1076	Corrosion in the Offshore Environment	J Sumner	32		10	Y		04/12/17	08/12/17	40	EX	100				w/c 02/01/18	10-14 Sept 18
9	I-OOT-A1083	Reliability Engineering and Asset Risk Management	M Shafiee	32		10	Y		15/01/18	19/01/18	40	ICW	100				FT 27/01/18 PT 10/02/18	July 18
10	I-OOT-A1080	Offshore Pipeline Design and Installation	F Kara	32		10	Y		29/01/18	02/02/18	40	EX	100				W/C 19/02/18	10-14 Sept 18
11	N-AME-SI	Structural Integrity	A Mehmanparast	38.5		10	Y		05/02/18	09/02/18	40	EX	100				w/c 19/02/18	10-14 Sept 18
12	G-MTI Occ A	Management for Technology	S Carver	50		10	Y		26/02/18	02/03/18	40 40	EX GCW	50 50				Exam 19-23/3/18	10-14 Sept 18

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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
																	GCW FT 10/03/18 PT 24/03/18	
13	I-ENE-GRPP Occ A	Group Project	G Drew	16		40	N		05/03/18	04/05/18	50	GPROJ ICW	80 20				01/05/18 11/05/18	
14	I-ENE-DISS Occ A	Dissertation (P/T students)	G Drew	10		40	N		02/10/17	29/09/18	50	IPROJ IPRES	80 20				28/09/18 28/09/18	
15	I-ENE-THESIS Occ A	Energy Individual Research Project	G Drew	20		80	N		07/05/18	07/0918	50	OR THESIS	10 90				03/09/18 03/09/18	

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Offshore and Ocean Technology Programme COURSE SPECIFICATION
QA&E USE ONLY: Version 4.1 August 2017

Course / SAS Version:1.0

MSc Theme	Offshore and Ocean Technology with Risk Management	Offshore and Ocean Technology with Materials Engineering	Offshore and Ocean Technology with Offshore Renewable Energy	Offshore and Ocean Technology with Pipeline Engineering	Offshore and Ocean Technology with Subsea Engineering		Marketed as short course	Joint with another MSc
Induction	C	C	C	C	C			
Offshore Renewable Energy - Technology	E	E	C	E	E			
Materials in the Offshore Environment	E	C	C	C	C			
Subsea Oil and Gas Exploitation	C	E	E	E	C			
Safety, Risk and Reliability Offshore	C	C	C	C	C			YES
Offshore Inspection	C	C	C	C	C			
Structural Integrity	E	C	E	E	E			YES
Management for Technology	C	C	C	C	C			YES
Corrosion in the Offshore Environment	C	C	C	C	C			
Engineering Stress Analysis: Theory and Simulations	E	E	E	E	E			YES
Reliability Engineering and Asset Risk Management	C	E	E	E	E			
Offshore Pipeline Design and Installation	E	E	E	C	E			
Group Project	C	C	C	C	C		NO	
Dissertation (for P/T students)	C	C	C	C	C		NO	
Individual Thesis Project	C	C	C	C	C		NO	

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

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
N-AME-SI	Structural Integrity	Advanced Mechanical Engineering	• Flow Assurance for Oil and Gas Production • Design of Rotating Machines • Renewable Energy Engineering • Safety Accident and Investigation • Offshore and Ocean Technology with Subsea Engineering • Offshore and Ocean Technology with Materials Engineering • Offshore and Ocean Technology with Risk Management • Offshore and Ocean Technology with Pipeline Engineering • Offshore and Ocean Technology with Renewable Energy • REMS EngD
N-AME-ESA	Engineering Stress Analysis: Theory and Simulations	Advanced Mechanical Engineering	• Design of Rotating Machines • Renewable Energy Engineering • REMS EngD • Offshore and Ocean Technology with Subsea Engineering • Offshore and Ocean Technology with Materials Engineering • Offshore and Ocean Technology with Risk Management • Offshore and Ocean Technology with Pipeline Engineering • Offshore and Ocean Technology with Renewable Energy
I-OOT-A1085	Subsea Oil and Gas Exploitation	Offshore and Ocean	• Cost Engineering • Offshore and Ocean

		Technology	• Technology with Subsea Engineering • Offshore and Ocean Technology with Materials Engineering • Offshore and Ocean Technology with Risk Management • Offshore and Ocean Technology with Pipeline Engineering • Offshore and Ocean Technology with Renewable Energy
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 Subsea Engineering • Offshore and Ocean Technology with Materials Engineering • Offshore and Ocean Technology with Risk Management • Offshore and Ocean Technology with Pipeline Engineering • Offshore and Ocean Technology with Renewable Energy • 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
I-OOT-A1078	Materials in the Offshore Environmental	Offshore and Ocean Technology	• REMS EngD

I-OOT-A1079	Offshore Inspection	Offshore and Ocean Technology	• REMS EngD

7. How are the ILOs assessed?

The following assessment types are utilised:

The assessment methods used on the course are designed to enable students to achieve the learning outcomes of the course in the following ways:

Written examination and coursework assignments (100% of PgCert, 66.7% of PgDip and 40% of MSc)

Each of the 8 modules undertaken by the student is assessed by a two hour duration written examination or coursework assignments.
Formal written examinations are designed to demonstrate each student's level of understanding and knowledge of the subject area, through their ability to select and apply this knowledge to the questions set.

Coursework assignments take the form of reports and the output from the practical application of software. These assignments will demonstrate skills in the areas including information retrieval, problem solving and analysis, writing style and computer application competence.

Group Project (33.3% of PgDip and 20% of MSc)

For the Group Project (full time students), an individual assessment for each student is calculated based on their continual contribution to the project throughout its duration, their written contribution to the final report and their contribution to an oral presentation by the team. Their mark is moderated to take into account the performance of the team as a whole in each of these 3 aspects.

Dissertation (33.3% of PgDip and 20% of MSc)
For the dissertation (part time students) an individual assessment for each student is done, based on a written report and an oral presentation with the support of a poster. 90% of the mark is based on the written report, while 10% on the oral presentation.

Individual Research Thesis (40% or MSc)

The individual project thesis is assessed by taking into account the quality of its introduction and literature review, the work carried out and results, the analysis/discussion and its style and presentation. The application and effort of the student is taken into account. Students are also required to undertake an oral presentation that has a 10% weighting within the individual project assessment.

This approach is in line with that adopted within the School of Water, Energy and Environment

Assessment and ILO Mapping

A. Postgraduate Certificate

Award ILOs / Module No.	ILO 1	ILO 2	ILO 3	ILO 4
2	EX	EX		EX
3				EX
4	ICW		ICW	ICW
5	EX	EX		EX
6	EX			EX
7			ICW	ICW
8				EX
9			ICW	ICW
10	EX	EX	EX	EX
11				EX
12		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.	ILO5
13	GPROJ ICW
14	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.	ILO6	ILO7
15	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?**

Students successfully completing the course should have gained the knowledge and skills required to enable them to gain employment at a professional level within the industrial sector that is addressed by the option which they followed. The global nature of the industries that are addressed by the course, viz., offshore oil and gas and offshore renewable energy, means that students will have the opportunities for travel and working in many overseas locations. Also, suitable graduates may have the opportunity of continuing their studies in a related area in pursuance of a research degree such as a PhD.

COURSE SPECIFICATION

Cranfield University: Course Specifications

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

COURSE TITLE: MSc in Operations Excellence

Date of first publication/latest revision: May 2017

1. What is the course?

Course information

Course Title	MSc in Operations Excellence
Course code	MSOPXPTC, PDOPXPTC, PCOPXPTC
Academic Year	2017/18
Valid entry routes	MSc
Additional exit routes	PgDip, PgCert
Mode of delivery	Part-time
Location(s)[1] of Study	Cranfield University and University of Cambridge
School(s)	School of Aerospace, Transport and Manufacturing
Theme	Manufacturing
Centre	Sustainable Manufacturing Systems Centre
Course Director	Dr Patrick McLaughlin
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 MSc - up to three years
Course Start Month(s)	Part-time: October

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[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

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Institutions delivering the course

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

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

Teaching and assessment is also provided by Cranfield School of Management and University of Cambridge.

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

The course has an Industrial Advisory Panel that formally meets twice a year. The names and affiliations of current members of the Industrial Advisory Panel can be found in the course manual.

Students are involved with field trips off-campus as part of the study tour. In recent years these have included the following organisations:, Jaguar, Land Rover, JCB manufacturing, JCB parts, BMW, AG Barr, Owen Mumford, Sony, Morgan, Weetabix and Virgin Atlantic.

Students undertake their group and individual research project off campus. In recent years, projects have been undertaken within their sponsoring organisation including Rolls-Royce, BAE Systems and Weetabix.

Cranfield University interacts with the Institute of Manufacturing at Cambridge University, as a strategic partner to deliver two course modules.

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 Institution of Engineering and Technology (IET), the Institution of Mechanical Engineers (IMechE) and the Royal Aeronautical Society (RAeS) until October 2019.

2. What are the aims of the course?

Cranfield University offers this course in order to:

- To prepare Manufacturing Engineers for a role in a changing world of manufacturing operations, that will lead to an improvement of manufacturing competitiveness within their company.
- To engage students in independent and critical evaluation of the use of operations management knowledge and tools to address manufacturing industry problems.
- To equip students in transferable skills such as communication, administration, team-working, and personal and professional effectiveness.
- To enhance a student's career in the manufacturing and related sectors.
- To assess a student's ability to demonstrate the application of management and technical knowledge and transferable skills to address operations management problems in industry.

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

This course is intended for the following range of students:

- Those wishing to work nationally or internationally with manufacturing companies that need to address operations management 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. Demonstrate knowledge of and an understanding of innovation management practice, its implementation and state-of-the-art tools and techniques for improving performance.

ILO 2. Demonstrate understanding and evaluate the role of a lean and agile manufacturing function within the wider business context.

ILO 3. Critically evaluate supply chain strategies and their effect on the performance of a manufacturing organisation.

ILO 4. Demonstrate knowledge of and an understanding of management accounting, costing and cost/technology trends and demonstrate critical awareness of management and leadership styles.

ILO 5. Demonstrate knowledge of tools and techniques to measure manufacturing performance and of BPR.

ILO 6. Critically evaluate the theory behind, and the selection of, appropriate analysis and design tools and apply them to solve manufacturing problems and increase the effectiveness of manufacturing planning and operations.

ILO 7. Demonstrate key management and personal management skills needed to influence and implement change.

ILO 8. Apply appropriate analysis and design tools to solve manufacturing problems in order to increase the effectiveness of manufacturing operations.

ILO 9. Demonstrate the skills necessary for the design, performance assessment, implementation and management of effective manufacturing systems

ILO 10. Present proposals and results in written and oral format to a variety of audiences.

ILO 11. Undertake a critical appraisal of technical and/or commercial literature.

ILO 12. Demonstrate ability in practical approaches to problem solving.

ILO 13. Critically evaluate data.

ILO 14. Discuss their work and relate it to the work of others.

ILO 15. Work effectively under time pressure.

ILO 16. Select appropriate technologies and methodologies to suit particular projects.

B. **Postgraduate Diploma**

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

ILO 17. Critically assess the relative merits of various technology management frameworks and select the most appropriate framework for the application.

ILO 18. Critically assess the key frameworks for the development of business and manufacturing strategies and to understand how, why and when they should be applied.

ILO 19. Demonstrate team based project skills to solve manufacturing problems within a manufacturing organisation.

C. MSc

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

ILO 20.   Demonstrate effective project management and in-depth subject knowledge through the individual project.

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 modules are typically delivered in one-week residential blocks between October (Year 1) March (Year 2).

The Taught Component

Each assessed module involves some 25-35 hours of class contact time, and a further 65-75 hours of student study to consolidate the work and carry out tutorial exercises, assignments etc (giving a nominal total of 100 learning hours per module).

The teaching methods include debates, case studies, simulations, practical sessions, field visits, lectures, seminars, and presentations.

All students attend a two-day course induction. Within this induction, students will be introduced to personal development planning and asked to reflect on their transferable skills and to take ownership of their personal development during the course.   Induction is followed by 8 weeks of assessed modules. There is a non-assessed module entitled Manufacturing in Practice (Study Tour).

Group Project

All students undertake a Group Project or produce a Dissertation. The Group Projects are group-based activities typically undertaken between March and May. The projects are designed to integrate knowledge, understanding and skills from the taught modules in a real-life situation.

The Group Project will involve a team of students, typically 4 to 8, working to investigate a manufacturing opportunity or solve a manufacturing problem.

If in the rare event that a team based activity is not possible because of logistical or confidentiality issues, a Dissertation may be produced. Both constitute 20% of the course. A full briefing will be given during the course.

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

Individual Research Project

All students will undertake a research project (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:	
Induction (1) Six modules from Modules 2-5 and 7-10	0 60
ELECTIVE MODULES:	
None	
TOTAL:	60

B.   Postgraduate Diploma

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

Description	Credits
COMPULSORY MODULES:	
Induction (1) Manufacturing in Practice (Study Tour) (6) Modules 2-5 and 7-10 Group Project or Dissertation (11a or 11b)	0 0 80 40
ELECTIVE MODULES:	
None	
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 (1) Manufacturing in Practice (Study Tour) (6) Modules 2-5 and 7-10 Group Project or Dissertation (11a or 11b) Thesis Project (12)	0 0 80 40 80
ELECTIVE MODULES:	
None	
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>

Part-time students register for the course in October and are expected to complete the course within 24 calendar months.

The course comprising of taught modules, group project and individual thesis is structured to allow time for more critical and independent learning and reflection.

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[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					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 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-OPX-INWK	Induction	Dr Patrick McLaughlin	17		0	N		10/10/17	11/10/17	N/A	AO	N/A				N/A	
2	I-OPX-EF	Effective Factories	Dr Charles Wainwright	30		10	N		06/11/17	10/11/17	40	EX	100				12/02/18	
3	I-OPX-BMS	Business and Manufacturing Strategy	Dr Patrick McLaughlin	35		10	N		08/01/18	12/01/18	40			100 MULTI	GCW GCW ICW	20 20 60	23/02/18	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 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	
4	I-OPX-MAHRM	Management Accounting and Human Resource Management	Dr Charles Wainwright	30		10	N		12/02/18	16/02/18	40	EX	100				19/03/18	
5	I-OPX-IM	Innovation Management	Dr Patrick McLaughlin	32		10	N		19/03/18	23/03/18	40	ICW	100				04/05/17	At the next available opportunity which may not be until the course runs the following year
6	I-OPX-ST	Manufacturing in Practice (Study Tour)	Dr Patrick McLaughlin	35		0	N		23/04/18	27/04/18	N/A	AO	N/A				N/A	
7	I-OPX-TM	Technology Management	Dr Patrick McLaughlin	35		10	N		25/06/18	29/06/18	40	ICW	100				17/08/18	At the next available opportunity which may not be until the course runs the following year
8	I-OPX-PPC	Production Planning and Control	Dr Charles Wainwright	30		10	N		03/09/18	07/09/18	40			100 MULTI	IPRES ICW	30 70	19/10/18	At the next available opportunity which may not be until the course runs the following year
9	I-OPX-MAI	Manufacturing Assessment and Improvement	Dr Charles Wainwright	30		10	N		19/11/18	23/11/18	40	ICW	100				18/01/19	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 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	
10	I-OPX-RCM	Realising Competitive Manufacturing	Dr Patrick McLaughlin	35		10	N		18/02/19	22/02/19	40			100 MULTI	GPRES GCW ICW	30 50 20	15/03/19	At the next available opportunity which may not be until the course runs the following year
11a	I-OPX-GP	Group Project	Dr Patrick McLaughlin	40		40	N		23/03/18	24/08/18				100 MULTI	GCW GPRES ICW	64 16 20	03/09/18	
11b	I-OPX-DISS	Dissertation	Dr Patrick McLaughlin	40		40	N		23/03/18	24/08/18		ICW	100				03/09/18	
12	I-OPX-THES	Thesis Project	Dr Patrick McLaughlin	40		80	N		23/11/18	23/08/19		THESIS OR	90 10				02/09/19	

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

9

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/A			

7. How are the ILOs assessed?

The following assessment types are utilised:

The course uses a range of assessment types. Students on the MSc can typically expect to have three written examinations, five pieces of individual assessment by submitted work, one piece of group project work (including a reflective summary 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.

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.)

The Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO1	ILO2	ILO3	ILO4	ILO5	ILO6	ILO7	ILO8	ILO9	ILO10	ILO11	ILO12	ILO13	ILO14	ILO15	ILO16	ILO17	ILO18	ILO19	ILO20
	Postgraduate Certificate																Postgraduate Diploma			MSc
1														AO						
2		EX	EX			EX	EX	EX	EX			EX			EX					
3			GCW ICW							GCW ICW				GCW ICW				ICW		
4				EX		EX									EX					
5	ICW						ICW					ICW								
6		AO												AO						
7										ICW			ICW	ICW		ICW	ICW			
8			IPRES ICW			IPRES ICW				IPRES ICW										
9		ICW	ICW		ICW	ICW	ICW	ICW	ICW	ICW		ICW	ICW	ICW		ICW				
10							GPRES GCW ICW	GPRES GCW ICW		GPRES GCW ICW		GPRES GCW ICW	GPRES GCW ICW		GPRES GCW ICW	GPRES GCW ICW				
11a										GPRES GCW ICW					GPRES GCW ICW				GPRES GCW ICW	
11b										ICW					ICW					
12										THESIS OR	THESIS OR	THESIS OR	THESIS OR	THESIS OR						THESIS OR

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

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

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

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

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

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

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

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

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

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

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

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

In terms of the likely career paths and employability of graduates completing the course, please refer to section 2. Students are sponsored by an employing organisation and are generally seeking a change in role that brings higher levels of formal responsibility, a broadening of existing skills and capabilities and a greater level of professionalism.

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:	Pre-Masters Course in Engineering

Date of first publication/latest revision:	June 2017

1. What is the course?

Course information

Course Title	Pre-Masters Course in Engineering
Course code	QPSOEFQC
Academic Year	2017/18
Valid entry routes	Not Applicable
Additional exit routes	Not Applicable
Mode of delivery	Full-time
Location(s)[1] of Study	Cranfield University
School(s)	School of Aerospace, Transport and Manufacturing
Theme	Aerospace
Centre	Centre for Aeronautics
Course Director	Dr Amir Zare Shahneh
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Ordinary degree or HND (with 3 years' experience) in engineering and physical science disciplines. Previous experience, aptitude and level of academic achievement will be assessed.
UK Qualifications Framework Level	QAA FHEQ Level 6/Level 7
Benchmark Statement(s)	Not Applicable
Registration Period(s) available	10 Months
Course Start Month(s)	October

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[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 is delivered by School of Aerospace, Transport and Manufacturing, Aerospace Theme, Centre for Aeronautics where the research interests include:

- Design of Environmentally Friendly Aircraft
- Blended Wing Body (BWB) Aircraft
- Unmanned Air Vehicles (UAV's)

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is not accredited by any external bodies.

2. What are the aims of the course?

Cranfield University offers this course in order to:

- develop the personal and professional skills needed in the Master's courses and later during the development of the student's career;
- introduce the students to the different aspects of aeronautical and mechanical engineering and lead them into their chosen MSc disciplines;
- refresh and enhance student understanding of engineering sciences and mathematics as applied to the appropriate engineering industries;
- enhance students technical English language skills and knowledge of research methods before entering their chosen MSc courses;
- give students experience of working on open ended project problems in preparation for their MSc Courses and subsequently their careers.

The course is intended for the following range of students:

- Wish to change career direction.
- Have been out of formal education for some time and wish to enhance their knowledge before entering our engineering MSc courses.
- Has a first degree in engineering, physics or mathematics that does not meet the standard entry requirements for a Cranfield MSc.
- EU & overseas students wishing to enhance their technical English language skills and knowledge of research methods before entering our engineering MSc courses.
- Hold a UK Ordinary/Pass degree in engineering & physical science disciplines (or equivalent).

This access course is unique and distinctive because it will develop the student's personal and professional skills needed for a Master's degree and their future career development. In addition, the course will refresh and enhance the student understanding of engineering sciences and mathematics as applied to the appropriate engineering industries.

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

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

A. **Pre-Masters Course in Engineering**

In completing this course successfully, a diligent student should be able to:

ILO 1.   Obtain a working knowledge of engineering fundamentals and demonstrate understanding of concepts, theories and principles of engineering subject relevant to the chosen MSc course. These are achieved by successfully completing the

modules offered within the course, such as Mechanical Design, Propulsion & Power, Basic Aerodynamics, Aeronautical Engineering, etc.;

ILO 2. Reinforce the necessary facility in mathematics to be applied when solving engineering problems;

ILO 3. Apply appropriate engineering tools to the analysis of problems by gaining confidence in working with modern computer systems and software packages, such as Visual Basic and CATIA;

ILO 4. Gain some experience in the use of appropriate practical engineering equipment and skills such as test machines and workshops;

ILO 5. Manage their time and individual study necessary to undertake a project or other assignment needing creative initiative from the student;

ILO 6. Develop their skills in presenting work and results successfully to a variety of audiences;

ILO 7. Use with confidence communication technical English language skills as applied to engineering projects;

ILO 8. Undertake a structured approach to research for individual projects at master level.

4. How is the course taught?

The course consists of two major groups of elements:

- Lecture Courses; All the lecture courses are mandatory. The only exception is the Academic English language module where it is required for EU/Overseas students needing to improve their academic English prior to attending MSc courses. Students who do not require the Academic English module will carry out further investigations and study on their Individual Project II. This activity will be included in the final project report and will be assessed by the student's supervisor.

- Individual Projects I and II; The Individual Projects I and II aim to provide students wishing to progress to MSc. Courses, with exposure to, and experience of, research projects similar to the Individual Research Projects to be performed during the MSc year.

Students will be supported in their learning and personal development by:
- Extensive computer network and IT facilities.
- Library facilities including journals, papers, and numerous databases.
- A dedicated course electronic Blackboard.

5. What do students need to achieve in order to proceed to a Masters Course?

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 proceed to a Masters Course:

Pre-Masters Course in Engineering COURSE SPECIFICATION
QA&E USE ONLY: Version 3.3 October 2017   Course / SAS Version:

A.   Pre-Masters Course in Engineering

The accumulation of 200 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Modules 1-11 and 13	140
If initial assessment of English Language level is assessed as 'must attend':	
• Module 12 (Academic English Language) and	10
• Module 14 (Individual Project I)	50
ELECTIVE MODULES:	
If initial assessment of English Language level is assessed as either 'should attend' or 'do not need to attend' either:	
• Module 12 (Academic English Language) and	10
• Module 14 (Individual Project I)	50
or	
• Module 15 (Individual Project II)	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

In order to proceed to an MSc course students 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

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[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);

- 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 at the end of September/beginning of October and are expected to complete the course by August of the following year.

The majority of the taught components are structured to be delivered during October to April while formal examinations will take place between December and April. The majority of the individual project activities will take place between March and August. The individual project will end by submitting an individual report and presenting the work to panel of staff members and supervisors.

Course modules

The following modules outline all parts of the programme leading to Pre-Masters Course in Engineering. 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 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	N-PY-MD	Mechanical Design	Jack Stockford	20		10	N		22.01.18	19.02.18	40			100	ICW EX	20 80	16.04.18	25.06.18
2	N-PY-ESA	Engineering Stress Analysis	Dr Hao Cui	20		10	N		31.10.17	08.12.17	40			100	ICW EX	20 80	11.12.17	19.03.18
3	N-PY-AE	Aeronautical Engineering	Jack Stockford	20		10	N		30.10.17	17.11.17	40	EX	100				11.12.17	19.03.18

[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 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
								7										
4	N-PY-BAEM	Basic Aerodynamics	Dr Amir Zare Shahneh	20		10	N		2.10.17	20.10.17	40	EX	100				08.01.18	27.06.17
5	N-PY-PP	Propulsion and Power	Prof Pericles Pilidis	20		10	N		19.01.18	16.03.18	40	EX	100				16.04.18	29.06.2018
6	N-PY-M1	Mathematics I	Dr Zeeshan Rana	40		20	N		03.10.18	01.12.18	40	EX	100				08.01.18	25.06.18
7	N-PY-M2	Mathematics II	Peter Sherar	40		20	N		15.01.18	16.03.18	40	EX	100				16.04.18	29.06.18
8	N-PY-EMF	An Introduction to Engineering Materials and Failure Analysis	Dr David Ayre	26		10	N		05.02.18	19.02.18	40	EX	100				16.04.18	26.06.18
9	N-PY-T	Thermofluids	Dr Ioannis Goulos	20		10	N		20.11.17	08.12.17	40	EX	100				03.01.18	27.06.18
10	N-PY-CAD	Computer Aided Design (CATIA)	Dr Adrian Clarke	15		10	N		15.01.18	23.01.18	40	ICW	100				23.02.18	29.06.18

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

7

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
11	N-PY-CF90	Computing Course	Dr Irfan Madani	30		10	N		09.10.17	10.11.17	40			100	ICW ICW	35 65	03.11.17 04.12.17	29.06.18
12	N-PY-AEL	Academic English Language	Joanne Holden	30		10	N		05.10.17	30.11.17	40			100	ICW IPRES	40 60	26.01.18 2.02.18	29.06.18
13	N-PY-RM	Research Methods	Dr Amir Zare Shahneh	20		10	N		16.01.18	01.03.18	40			100	ICW IPRES	40 60	09.02.18 01.03.18	29.06.18
14	N-PY-IP1	Individual Project I	Various	30		50	N		06.11.17	04.07.18		THESIS OR	90 10				01.07.18 04.07.18	
15	N-PY-IP2	Individual Project II	Various	30		60	N		06.11.17	04.07.18		THESIS OR	90 10				01.07.18 04.07.18	

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/A			

7. How are the ILOs assessed?

The following assessment types are utilised:

The Students are assessed by a combination of 9 written examinations, 6 pieces of assessment by written assignments, 1 element of assessment by oral presentation. In addition the Individual Project I & II will be examined by a report and oral presentation.

This approach has been adopted to ensure that students develop their personal and professional skills needed for a Master's degree and the use the methodologies, philosophies and tools used in industry to provide them with the experience of working on engineering related projects.

Assessment and ILO Mapping

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

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

A. Pre-Masters Course in Engineering

Course ILOs / Module No.	ILO1	ILO2	ILO3	ILO4	ILO5	ILO6	ILO7	ILO8
1	EX, ICW	EX, ICW	EX, ICW		ICW			
2	EX, ICW	EX, ICW	EX, ICW		ICW			
3	EX							
4	EX	EX	EX					
5	EX	EX	EX					
6	EX	EX						
7	EX	EX						
8	EX	EX	EX					
9	EX	EX	EX					
10	ICW	ICW	ICW	ICW	ICW			
11	ICW	ICW	ICW	ICW	ICW			
12						ICW IPRES	ICW IPRES	
13			ICW		ICW	IPRES		
14	THESIS	THESIS	THESIS		THESIS	OR	THESIS	THESIS OR
15	THESIS	THESIS	THESIS		THESIS	OR	THESIS	THESIS OR

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 Pre-Master Course in Engineering covers many aspects of general engineering fields including aerospace, automotive and offshore. On successful completion of this programme the School of Aerospace, Transport and Manufacturing and the School of Water, Energy and Environment offer students entry to their MSc courses in these sectors.

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 Process Systems Engineering

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

1. What is the course?

Course information

Course Title	Process Systems Engineering
Course code	MSPSEFTC, MSPSEPTC, PDESPFTC, PDESPPTC, PCESPFTC, PCESPPTC (UK) MSECOFTC, MSESOPTC (Muscat)
Academic Year	2017/18
Valid entry routes	Cranfield - PgCert, PgDip, MSc 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 Giorgos Kopanos
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

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[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

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

Institutions delivering the course

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

- Process and Energy Systems Design, Operation, Simulation and Optimisation
- Process Control
- Process and Flow Measurements
- Technical and Economic Viability Assessments of Process and Energy Systems

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

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

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

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 order to provide engineering and applied science graduates with current theory and practice of the technical and managerial aspects of process systems. Material presented in the course modules is generic and thus applicable to the design, operation and control of a wide range of process plants, including those employed by the oil and gas, petrochemical, chemical, pharmaceutical, water, food and drink and power industries. The course has evolved over the past 10 years as a result of 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.

This programme is intended for the following range of students:

- Engineering and applied science graduates and practicing engineers wishing to pursue a technical management career in the strongly growing process industry sector.
- 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 Process Systems Engineering

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

ILO 1.   Evaluate the technical, environmental and economic issues involved in the design and operation of process plants and the current practice in process industries.

ILO 2.   Apply effectively the knowledge gained to the design, operation, optimisation and control of process systems via proper methodologies and relevant software.

ILO 3.   Apply independent learning, especially via the effective use of information retrieval systems and a competent and professional approach to solving problems of industrial process systems.

ILO 4.   Apply and critically evaluate key technical management principles, including project management, people management, technology marketing, product development and finance.

ILO 5.   Apply advanced approaches and use effectively related tools in more specialised subjects related to process industries (for example risk management, biofuels or CFD tools).

B. Postgraduate Diploma in Process Systems Engineering

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

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

C. MSc in Process Systems Engineering

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

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

- A dedicated electronic Blackboard site
- One-day workshop in MATLAB training
- 1-day seminar in principles and techniques of process intensification
- Arrangement of attendance of relevant modules offered by other MSc programmes

The taught programme is generally delivered from October to February. Each module is generally delivered over one week.

The Group Project is delivered between March and May. Each group will typically include 4-6 students and an academic supervisor will be assigned to each group. Formal project review meetings will be held on a bi-weekly basis at which each student will be required to provide a brief presentation on the work performed to date. The academic supervisor will participate in these project review meetings to record attendance, assess the individual oral presentations and level of contribution to the project and to provide guidance as appropriate. Students taking the group project are required to participate in at least 80% of these review meetings. Additionally, it is expected that students will meet and work on the project outside of the formal meetings. A (student) project co-ordinator will be nominated to ensure that these meetings are used to good effect and appropriate minutes are taken and findings reported to the academic supervisor. Students will be required to attend in person the initial and final project review meetings. Students are required to keep a journal throughout as documentary evidence of his/her contribution to the Group Project

Part-time students will carry out a dissertation project in place of the Group project.

The Individual Research Project is typically delivered between May 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:	
Management for Technology	10
Process Plant Operations	10
Process Design and Simulation	10
Advanced Control Systems	10

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Description	Credits
Thermal Systems Operation and Design	10
Advanced Optimisation of Energy and Process Systems	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:	
Management for Technology	10
Process Plant Operations	10
Process Design and Simulation	10
Advanced Control Systems	10
Thermal Systems Operation and Design	10
Advanced Optimisation of Energy and Process Systems	10
Group Project (Compulsory for Full-Time Students)*	40
ELECTIVE MODULES:	
2 modules from: Risk & Reliability Engineering Process Measurement Systems Computational Fluid Dynamics for Industrial Processes Biofuels & Biorefining	20 (10 credits per module)
*Dissertation in place of group project (for Part-Time students)	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:	
Management for Technology	10
Process Plant Operations	10
Process Design and Simulation	10
Advanced Control Systems	10
Thermal Systems Operation and Design	10
Advanced Optimisation of Energy and Process Systems	10
Group Project (Compulsory for Full-Time Students)*	40
Individual Research Project	80
ELECTIVE MODULES:	

2 modules from: Risk & Reliability Engineering Process Measurement Systems Computational Fluid Dynamics for Industrial Processes Biofuels & Biorefining	20 (10 credits per module)
Dissertation in place of group project (for part time students)	40
TOTAL:	**200**

D. MSc (in Muscat)

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:	
Process Plant Operations	10
Process Design and Simulation	10
Advanced Control Systems	10
Computational Fluid Dynamics for Industrial Processes	10
Risk and Reliability Engineering	10
Thermal Systems Operation and Design	10
Process Measurement Systems	10
Management for Technology	10
Group Project (Compulsory for full time students)	40
Thesis	80
ELECTIVE MODULES:	
Dissertation in place of group project (for part time students)	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]

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[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).

- **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).

5. <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.

Postgraduate Diploma (PgDip) and Postgraduate Certificate (PgCert) exit routes are provided as fall back routes for MSc candidates.

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[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%).

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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 — 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
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-PSE-PPO Occ A	PSE11 Process Plant Operations	G Kopanos	30		10	Y		23/10/17	27/10/17	40	EX	100				11-14/12/17	10-14/09/18

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[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 module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
3	N-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
4	N-AME-RR Occ A	PSE03 Risk and Reliability Engineering	A Kolios	30		10	Y		13/11/17	17/11/17	40	EX	100				2-4/1/18	10-14/09/18
5	N-PSE-TSOD Occ A	PSE19 Thermal Systems Operation and Design	I Sher	30		10	Y		20/11/17	24/11/17				100	EX EX	50 50	2-4/1/18	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-BPE-BPT Occ A	Biofuels & Biorefining	B Fidalgo Fernandez	30		10	Y		8/1/18	12/1/18	40	ICW	100				FT 20/1/18 PT 3/2/18	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

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
8	N-PSE-PSD Occ A	PSE13 Process Design and Simulation	G Kopanos	30		10	Y		22/1/18	26/1/18	40	ICW	100				FT 3/2/18 PT 17/2/18	July 18
9	N-PSE-AOPES Occ A	Advanced Optimisation of Process and Energy Systems	G Kopanos	30		10	Y		5/2/18	9/2/18	40	ICW	100				FT 24/2/18 PT 10/3/18	July 18
10	N-PSE-PMS Occ A	PSE10 Process Measurement Systems	Dr Liyun Lao	30		10	Y		12/2/18	16/2/18	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		26/2/18	2/3/18	40	EX GCW	50 50				EX 19-23/3/18 CW FT 10/3/18 PT 24/3/18	10-14/09/18
12	I-ENE-GRPP Occ A	Group Project	G Drew	16		40	Y		5/3/18	4/5/18	50 50	GPROJ ICW	80 20				01/05/18 11/5/18	

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 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			Independent Assessment		Multi-part Assessment			Submission dates	
13	I-ENE-DISS Occ A	Dissertation for part time students	G Drew	10		40	Y		2/10/17	29/9/18	50 50	IPROJ IPRES	80 20				28/9/18	
14	I-ENE-THESIS Occ A	Energy Individual Research Project	G Drew	20		80	Y		7/5/18	7/9/18	50 50	OR THESIS	10 90				03/09/18 3/9/18	

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 Numbe	Module code	Title	Module Leader	Contact hours[12]	delivered by Visiting	Credits	module shared?	Calendar				Independent Assessment	Multi-part Assessment	Submission dates

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

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	Module Title	Lecturer									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	N/A	AO	N/A				N/A	
2	N-PSE-PPO Occ B	PSE11 Process Plant Operations	G Kopanos	30		10	Y		17/09/17	21/09/17	40	EX	100				11-14/12/17	10-14/09/18
3	N-PSE-ACS Occ B	PSE12 Advanced Control Systems	Y Cao	30		10	Y		22/10/17	26/10/17	40	ICW	100				F/T 02/11/17 P/T 16/11/17	July 18
4	N-AME-RR Occ B	PSE03 Risk and Reliability Engineering	A Kolios	30		10	Y		03/12/17	07/12/17	40	EX	100				Exam week 2	10-14/09/18
5	N-PSE-TSOD Occ B	PSE19 Thermal Systems Operation and Design	I Sher	30		10	Y		7/1/18	11/1/18	40			100	EX EX	50 50	19-22/2/18	10-14/09/18

[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	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**	
6	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				F/T 30/11/17 P/T 14/12/17	July 18
8	N-PSE-PSD Occ B	PSE13 Process Design and Simulation	G Kopanos	30		10	Y		08/10/17	12/10/17	40	ICW	100				F/T 19/10/17 P/T 02/11/17	July 18
10	N-PSE-PMS Occ B	PSE10 Process Measurement Systems	Dr Liyun Lao	30		10	Y		21/01/18	25/01/18	40	ICW	100				F/T 01/02/18 P/T 15/02/18	July 18
11	G-MTI Occ C	PSE02 Management for Technology	S Carver	50		10	Y		04/02/18	08/02/18	40	EX GCW	50 50				Ex 19-22/3/18 GCW F/T 15/02/18 P/T 01/03/18	10-14/09/18 July
12	I-ENE-GRPP Occ B	Group Project	G Drew	16		40	Y		05/03/18	4/5/18	50 50	GPROJ ICW	80 20				01/05/18 11/05/18	

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

Module Number	Module code	Title	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							
								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 module15 (%) of Independent assessments	Weighting within module of multi-part assessments16(40%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
13	I-ENE-DISS Occ B	Dissertation for part time students	G Drew	10		40	Y		02/10/17	29/09/18	50 50	IPROJ IPRES	80 20				28/9/18 28/9/18	
14	I-ENE-THESIS Occ B	Energy Individual Research Project	G Drew	20		80	Y		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

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
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 Subsea Engineering • Offshore and Ocean Technology with Materials Engineering • Offshore and Ocean Technology with Risk Management • Offshore and Ocean Technology with Pipeline Engineering • Offshore and Ocean Technology with Renewable Energy • 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
N-AME-RR	Risk and Reliability Engineering	Advanced Mechanical Engineering	• Flow Assurance for Oil and Gas Production • Renewable Energy Engineering • Carbon Capture and Storage • Process Systems Engineering
N-PSE-ACS	Advanced Control Systems	Process Systems Engineering	• Advanced Mechanical Engineering • Biofuels Process Engineering

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			• Flow Assurance for Oil and Gas Production • Carbon Capture and Storage • Energy Systems and Thermal Processes
N-PSE-CETIP	Computational Fluid Dynamics for Industrial Processes	Process Systems Engineering	• Energy Systems and Thermal Processes • Flow Assurance for Oil and Gas Production • Carbon Capture and Storage
N-PSE-PSD	Process Design and Simulation	Process Systems Engineering	• Biofuels Process Engineering • Carbon Capture and Storage • Flow Assurance for Oil and Gas Production
N-PSE-PMS	Process Measurement Systems	Process Systems Engineering	• Flow Assurance for Oil and Gas Production • Carbon Capture and Storage • Energy Systems and Thermal Processes
N-PSE-PPO	Process Plant Operation	Process Systems Engineering	• Flow Assurance for Oil and Gas Production • Biofuels Process Engineering • Carbon Capture and Storage • Cost Engineering
N-PSE-TSOD	Thermal Systems Operation and Design	Process Systems Engineering	• Energy Systems and Thermal Processes
N-PSE-AOPES	Advanced Optimisation of Process and Energy Systems	Process Systems Engineering	• Energy Systems and Thermal Processes
N-BPE-BPT	Biofuels and Biorefining	Advanced Chemical Engineering – Biorefining Route	• Process Systems 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 6–8 written examinations, 7 pieces of assessment by submitted work and 4–5 elements of assessment by presentation or viva.

This approach has been adopted in order to:

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

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 at Cranfield

Award ILOs / Module No.	ILO 1	ILO2	ILO3	ILO4
2	EX		EX	
3		ICW		
5	EX		EX	
8	ICW	ICW	ICW	
9	ICW	ICW	ICW	
11				EX GCW

B. PgDip at Cranfield

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	ILO3	ILO4	ILO5	ILO6
4	EX			EX	EX	
6		ICW	ICW			
7	ICW			ICW		
10	ICW		ICW	ICW		

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Module No. \ Award ILOs	ILO 1	ILO 2	ILO3	ILO4	ILO5	ILO6
12 (FT)						GPROJ ICW
13 (PT)						IPROJ IPRES

C. MSc at Cranfield

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

Module No. \ Award ILOs	ILO7	ILO8
14	THESIS OR	THESIS OR

D. MSc in Muscat

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

Module No. \ Award ILOs	ILO1	ILO2	ILO3	ILO4	ILO5	ILO6	ILO7	ILO8
2	EX		EX					
3		ICW						
4	EX			EX	EX			
5	EX		EX					
6		ICW	ICW		ICW			
8	ICW	ICW	ICW					
10	ICW		ICW		ICW			
11				EX GCW				
12 (FT)						GPROJ ICW		
13 (PT)						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. <u>What opportunities are graduates likely to have on completing the course?</u>

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

- Engineering consultancies and design practices
- Industries:
    - Oil and gas
    - Petrochemical
    - Chemical
    - Pharmaceutical
    - Water
    - Power
    - Food and drink
- Research organisations
- 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 Procurement and Supply Chain Management

Date of first publication/latest revision:	March 2017

1. What is the course?

Course information

Course Title	MSc in Procurement and Supply Chain Management
Course code	MSPSCFTC, PDPSCFTC, PCPSCFTC
Academic Year	2017/18
Valid entry routes	MSc
Additional Exit routes	PgDip, PgCert
Mode of delivery	Full-time
Location(s)[1] of Study	Cranfield Campus
School(s)	School of Management
Theme	Leadership and Management
Centre	Centre for Demand Chain Management
Course Director	Dr Denyse Julien
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	Full-time MSc - one year
Course Start Month(s)	September

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[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

Procurement and Supply Chain Management COURSE SPECIFICATION
QA&E USE ONLY: Version 4.1 August 2017   Course / SAS Version:

Institutions delivering the course

This course is delivered by the School of Management/Centre for Demand Chain Management, where the research interests include procurement, logistics, supply chain management and marketing.

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 Institute of Logistics & Transport until 2021 and The Chartered Institute of Purchasing and Supply until August 2017.

2. What are the aims of the course?

Cranfield University offers this course in order to fulfil a market demand for highly capable graduates in the field of Procurement and Supply Chain Management. This is addressed through the aims of the course, which are to provide students with:

- An overall appreciation of procurement and supply chain management and their importance to modern business.
- Appropriate technical knowledge in the key areas of procurement and supply chain management.
- Analytical, managerial and critical thinking skills that will enable them to apply this knowledge within a business environment.
- A critical understanding of the need to manage and plan supply chains within an overall business environment in an integrated and co-ordinated manner.
- Development in their ability to manage in complex and uncertain situations by focusing on soft skills such as communication, team-working and negotiation,
- Development in their ability to analyse, synthesise and critically evaluate information to take more effective management decisions.
- An understanding of the ethical and environmental implications of procurement and supply chain management decisions,

This programme is intended for graduates from a wide range of backgrounds who are interested in developing a career in procurement and supply chain management. This course may also appeal to candidates who want to move into procurement from a different management field.

Postgraduate Diploma (PgDip) and Postgraduate Certificate (PgCert) exit routes are provided for students who do not progress to the full MSc.

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. Be able to identify appropriate techniques to address specific challenges in supply chain management.
ILO 2. Analyse and solve supply chain problems systematically.
ILO 3. Make reasoned judgements in the absence of complete data.
ILO 4. Critically evaluate the application of current supply chain management research and evaluate its relevance to organisational practice.

ILO 5. Communicate their conclusions clearly to specialist and non-specialist audiences.

B. Postgraduate Diploma

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

ILO 6. Possess a systematic understanding of supply chain knowledge, and a critical awareness of current supply chain problems and new thinking at the forefront of their discipline.

ILO 7. Be able to be original in the application of knowledge, together with a practical understanding of the analytical and managerial skills that will enable them to apply this knowledge within an overall business environment in a logical and coherent manner.

ILO 8. Be able to analyse and solve complex procurement and supply chain problems systematically and creatively.

ILO 9. Demonstrate self-direction and originality in solving supply chain problems and to act professionally in planning and implementing tasks and projects.

ILO 10. Demonstrate additional transferrable skills, including; effective communication, consultancy, project management, negotiation, cultural awareness and leadership.

C MSc

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

ILO 11. Independently and confidently be able to apply procurement and supply management theories, tools and techniques to a variety of situations.

ILO 12. Demonstrate the ability to adapt appropriate procurement and supply management frameworks and contextualise for a specific organisational issue accurately.

ILO 13. Display practical ability in self-directed research, data gathering, data analysis and interpretation, report writing and presentation skills.

ILO 14. Judge appropriate research methodologies for conducting research, and draw justifiable inferences from the data and analysis generated.

ILO 15. Critically evaluate and synthesis the published literature.

ILO 16. Undertake independent study on a relevant procurement and supply management subject, demonstrating the ability to plan, manage and execute an industrial (private or public sectors) or research based project with specified time scales.

ILO 17. Produce a high quality thesis and critically evaluate the interpretations of the data.

4. How is the course taught?

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

- Lectures
- Student centred learning/reflection
- Case studies
- Workshops
- Video and audio materials
- Simulation
- Tutorials
- Problem based learning projects
- The supply chain game played over an extended period is designed to develop team working skills and also as activity which acts to integrate skills and knowledge learned elsewhere on the course.

- Individual research project with academic supervisors

In addition to these methods the programme offers:

- Orientation week
- An international study tour which takes place in Term 3
- A programme of visits and lectures by external speakers
- Learning teams supported by an academic tutor
- Extensive use is made of BlackBoard (VLE) as a means of delivering material to support and augment classroom learning
- Library induction, referencing and plagiarism sessions
- PDP specifically supported through SOM careers development sessions

The aim is to provide a varied, stimulating and experiential learning environment. All taught modules consist of formal lecturers, in-class case discussions, group and self-study. Group project work, reflective practice and class exercises are used to develop problem solving skills. The students are exposed to leading procurement and supply chain concepts through the use of expert external speakers and the output of faculty research.

Two of the key elements of the teaching and learning strategy of the course are centred on the individual thesis where the focus is on problem analysis and solution development of a sponsoring organisations supply chain problem. Tutorial support is given to aid the students to develop their own skills and to apply what has been taught on the course.

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

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

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

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

Description	Credits
COMPULSORY MODULES:	
Module 1 plus 50 credits from the taught modules	60
ELECTIVE MODULES:	
N/A	N/A
TOTAL:	**60**

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

Description	Credits
COMPULSORY MODULES:	

10 x 10-credit modules (1-10)	100
2 x 5-credit modules (11-12)	10
ELECTIVE MODULES:	
2 x 5-credit modules (13-22)	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:	
10 x 10-credit modules (1-10)	100
2 x 5-credit modules (11-12)	10
Personal Development (23)	0
Research Methods (24)	0
Thesis (25)	80
ELECTIVE MODULES:	
2 x 5-credit modules (13-22)	10
TOTAL:	**200**

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

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

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

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

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[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%).

- 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 in September the following year.

The course is structured around four eleven week terms. In the first from September to December the students are given a thorough grounding in procurement and supply chain management through a series of six compulsory core elements, including the participation in a supply chain game, which integrates students' learning from the course and develops their team working skills.

In the second term from January to March, students study the remaining four compulsory 10 credit modules, two procurement 5 credit modules and two 5 credit options. The electives allow the students to start to specialise and to tailor their learning to their own interests within procurement and supply chain management.

The third and fourth terms are effectively merged and during this period the students undertake an individual thesis project. It is expected that the majority of students will undertake this thesis project within an organisation, which can be in the profit or not for profit sector. Alternatively, students can undertake a Cranfield led research based thesis project.

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	M-L/PSP	Principles of Strategic Procurement	Farooq Habib	25		10	Y		02/10/17	15/12/17	40	ICW	100				11/01/18	
2	M-L/SCSS	Supply Chain Strategy and Sustainability	Dr Heather Skipworth	25		10	Y		02/10/17	15/12/17	40 40	GPRES ICW	25 75				TBC 23/11/17	
3	M-L/ACF	Accounting and Finance	Dr Simon Templar	25		10	Y		02/10/17	15/12/17	40	EX	100				w/c 11/12/17	

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[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 - 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
4	M-L/ATS	Analytical Techniques for Supply Chain Management	Dr Emel Aktas	35		10	Y		02/10/17	15/12/17	40	EX	100				w/c 11/12/17	
5	M-L/FRT	Freight Transport	Melvyn Peters	25		10	Y		02/10/17	15/12/17	40	ICW	100				18/01/18	
6	M-L/IOM	Inventory and Operations Management	Dr Benny Tjahjono	25		10	Y		02/10/17	15/12/17	40			100 MULTI	GCW ICW	60 40	30/11/17	
7	M-L/ISB	Information Systems and e-Business	Dr Vahid Mirza Beiki	25		10	Y		08/01/18	23/03/18	40 40	GCW ICW	80 20				13/04/18 13/04/18	
8	M-L/PMI	Project Management Introduction	John Algar	25		10	Y		05/02/18	09/02/18	40			100 MULTI	GCW GPRAC GPRES	30 40 30	TBC TBC	
9	M-P/SSE	Supplier Selection and Evaluation	Dr Soroosh Saghiri	25		10	N		08/01/18	23/03/18	40	ICW	100					
10	M-P/NCM	Negotiation and Contract Management	Dr Ian Speakman	25		10	N		08/01/18	23/03/18	40 40	GPRAC ICW	30 70					
11	M-P/BPO	Business Process Outsourcing	Dr Vahid Mirza Beiki	12		5	Y		08/01/18	23/03/18	40			100 MULTI	GCW ICW	75 25	01/03/18	

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

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	
12	M-P/RSC	Designing and Managing Resilient Supply Chains	Dr Uta Jüttner	12		5	Y		08/01/18	23/03/18	40	GCW	100				15/03/18	
13	M-L/OUT	Logistics Outsourcing	Melvyn Peters	12		5	Y		08/01/18	23/03/18	40	ICW	100				12/02/18	
14	M-L/PRR	Planning and Resourcing Road Freight Transport	Melvyn Peters	12		5	Y		08/01/18	23/03/18	40			100 MULTI	GPRES GCW ICW	10 40 50	05/03/18 05/03/18 TBC	
15	M-L/HLR	Humanitarian Logistics	Dr Silvia Rossi Tafuri	12		5	Y		08/01/18	23/03/18	40	ICW	100				07/03/18	
16	M-L/SIM	Simulation	Dr Nicky Yates	12		5	Y		08/01/18	23/03/18	40	ICW	100				11/04/18	
17	M-L/SXS	Six Sigma	Farooq Habib	12		5	Y		08/01/18	23/03/18	40			100 MULTI	GCW ICW	75 25	09/04/18	
18	M-L/PFM	Performance Measurement in the Supply Chain	Dr Andrey Pavlov	12		5	Y		08/01/18	23/03/18	40	ICW	100				19/02/18	
19	M-L/SOP	Sales and Operations Planning	Dr Heather Skipworth	12		5	Y		08/01/18	23/03/18	40	ICW	100				08/02/18	
20	M-L/RLO	Retail Logistics	Prof Michael Bourlakis	12		5	Y		08/01/18	23/03/18	40	ICW	100				16/04/18	

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

Procurement and Supply Chain Management COURSE SPECIFICATION
QA&E USE ONLY: Version 4.1 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' - 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 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
21	M-L/SNCC	Social Network Analysis in a Supply Chain Context	Dr Leila Alinaghian	12		5	Y		08/01/18	23/03/18	40	ICW	100					09/03/18	
22	M-L/BMG	Business Model Generation	Dr Denyse Julien	12		5	Y		08/01/18	23/03/18	40	GCW	100					02/02/18	
23	M-L/PDV	Personal Development	Dr Denyse Julien	0		0	Y		02/10/17	23/03/18	N/A	AO	N/A					N/A	
24	M-L/RSM	Research Methods	Dr Denyse Julien	12		0	Y		09/04/18	29/04/18	N/A	AO	N/A					N/A	
25	M-L/THS	Thesis	Supervisor	0		80	Y		01/04/18	03/06/18		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

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

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
M-L/PSP	Principles of Strategic Procurement	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/SCSS	Supply Chain Strategy and Sustainability	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/ACF	Accounting and Finance	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/ATS	Analytical Techniques for Supply Chain Management	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/FRT	Freight Transport	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/IOM	Inventory and Operations Management	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/ISB	Information Systems and e-Business	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/PMI	Project Management Introduction	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-P/BPO	Business Process Outsourcing	Procurement and Supply Chain Management	Logistics and Supply Chain Management
M-P/RSC	Designing and Managing Resilient Supply Chains	Procurement and Supply Chain Management	Logistics and Supply Chain Management
M-L/OUT	Logistics Outsourcing	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/PRR	Planning and Resourcing Road Freight Transport	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/HLR	Humanitarian Logistics	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/SIM	Simulation	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/SXS	Six Sigma	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/PFM	Performance Measurement in the Supply Chain	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/SOP	Sales and Operations Planning	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/RLO	Retail Logistics	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/SNCC	Social Network Analysis in a Supply Chain Context	Logistics and Supply Chain Management	Logistics and Supply Chain Management
New Module	Business Model Generation	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/PDV	Personal Development	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/RSM	Research Methods	Logistics and Supply Chain Management	Logistics and Supply Chain Management
M-L/THS	Individual Thesis	Logistics and Supply Chain Management	Logistics and Supply Chain Management

7. How are the ILOs assessed?

The following assessment types are utilised:

- Technical reports, case analysis, simulations, use of computer packages to analyse problems, and examinations.
- The individual thesis is focused on real world problems and is also used in assessing the course.

This approach has been adopted because:

A wide range of assessments are used on the course in order to determine whether or not course, module and lesson learning objectives are achieved. These assessments are used to monitor student progress and to inform the teaching learning strategies of the course and individuals teaching on the course.

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.	ILO1	ILO2	ILO3	ILO4	ILO5	ILO6	ILO7	ILO8	ILO9	ILO10	ILO11	ILO12	ILO13	ILO14	ILO15	ILO16	ILO17
	PG Certificate in Supply Chain Management						PG Diploma in Procurement and Supply Chain Management				MSc in Procurement and Supply Chain Management						
1	✓	✓		✓	✓	✓				✓		✓					
2		✓	✓	✓	✓	✓			✓	✓		✓					
3				✓				✓									
4	✓	✓	✓	✓		✓	✓	✓				✓					
5		✓		✓	✓	✓											
6	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓					
7	✓			✓						✓							
8	✓		✓		✓				✓	✓							
9	✓	✓	✓		✓	✓	✓	✓		✓							
10	✓	✓	✓		✓	✓			✓	✓							
11			✓		✓	✓				✓	✓	✓					
12	✓	✓	✓		✓	✓	✓	✓		✓	✓						
13	✓	✓				✓					✓	✓					
14	✓	✓				✓	✓				✓	✓					
15	✓				✓	✓				✓	✓						
16	✓	✓				✓	✓				✓	✓					
17	✓	✓	✓		✓	✓				✓	✓	✓					
18					✓	✓				✓	✓			✓			
19	✓	✓	✓		✓	✓				✓	✓						
20	✓	✓					✓	✓		✓	✓						
21	✓	✓	✓			✓	✓	✓		✓	✓						
22		✓					✓	✓	✓		✓						
23			✓		✓				✓			✓	✓			✓	
24				✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
25				✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Procurement and Supply Chain Management COURSE SPECIFICATION
QA&E USE ONLY: Version 4.1 August 2017   Course / SAS Version:

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

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

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

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

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

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

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

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

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

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

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

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

As supply chains become longer and more complex, the job market increasingly demands graduates with procurement skills and expertise. Hays' (2014) survey indicates that the most important recruitment requirement for many organisations is to attract in new procurement talent. In manufacturing sectors, professionals with analytical, planning and leadership skills who can manage complex procurement and supply processes are increasingly sought after. The situation in the public sector is also promising, as the role procurement plays in containing costs has resulted in increased public scrutiny and government interest. Thus, there is a strong demand for a range of procurement professionals across the private and public sectors.

In the UK, the job market is confronting a shortage of procurement professionals. Hays' (2014) survey underlines the existing concerns about finding experienced, qualified, skilful candidates for available vacancies. The survey shows that more than one third of companies cannot find well-qualified procurement professionals, and skills shortage is a problem for nearly half of the companies. This trend is not only limited to the UK; research in Europe, the USA and the Asia Pacific region also indicate a shortage of talent in procurement and supply. This situation presents candidates with a fertile ground to find job opportunities after completing the course.

Reference: Hays (2014), Driving strategic value creating a higher profile. HAYS Recruiting Experts in Procurement, hays.co.uk.

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 Programme and Project Management

Date of first publication/latest revision: January 2018

1. What is the course?

Course information

Course Title	MSc in Programme and Project Management
Course code	MSPPMPTR, PDPPMPTR, PCPPMPTR
Academic Year	2016-17
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 School of Management and Cranfield Defence and Security
Theme	Leadership and Management
Centre	Cranfield University, School of Management
Course Director	Aidan Turner
Awarding Body	Cranfield University,
Is this an AP Contract course?[2]	Yes
Teaching Institution	Cranfield University,
Admissions body	Cranfield University
Entry requirements	UK 1st or 2nd class honours degree in relevant subject areas or international equivalent or relevant work experience in combination with or without a degree below 2nd class honours
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters))
Benchmark Statement(s)	N/A
Registration Period(s)	5 years for MoD Part-time

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[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 Cranfield University School of Management and Cranfield Defence and Security where the research interests include a wide range of private and public sector management issues.

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

The MSc is accredited formally by Association for Project Management APM until April 2020.

2. What are the aims of the course?

Cranfield University aims to bring together programme and project managers to maximise their understanding, develop new skills and competences and encourage new solutions for previously unsolved project and programme related problems. In particular:

1. To equip students so that upon completion of their MSc dissertation, students will be able to facilitate the development of future knowledge in the subject area from a practice perspective.
2. To develop the capabilities to conduct independent research into an aspect of programme management, strategic project management or programme leadership in a defence management or government context.
3. To enable students to demonstrate critical awareness and evaluation of current research and advanced practice in the field of managing programmes of projects.

This post-experience programme is intended for project/programme professionals or those who are actively involved in projects/programmes in their organisations. A typical participant would normally:
1. Have been in a management or command position for at least 2 years and have had relevant experience for a minimum of 5 years **and**
2. Hold a relevant recognised UK degree with honours in class 1 or 2 **or**
3. Hold academic or professional qualifications judged equivalent to a degree **or**
4. Have met specific standards, as prescribed by Cranfield University, designed to assess numeracy, verbal reasoning, report writing, presentation and interview skills to MSc entrance level.

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. to apply the basic theoretical concepts that underpin programme and project management
   ILO 2. to analyse programme and project management literature to ensure competence in a wide range of related project management techniques

ILO 3.   to demonstrate a critical application of the general theory of strategic management and to understand its implementation through the strategic management of programmes and projects

ILO 4.   to be able to evaluate ways of planning and implementing project progress through monitoring and control, configuration management and the ways of accelerating a project

ILO 5.   to be able to carry out the financial analysis and value management of programmes and projects

ILO 6.   to make effective oral and written presentations.

B. Postgraduate Diploma

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

ILO 7.   to apply the basic concepts of defining project authority, contractual agreements and procurement theory

ILO 8.   to analyse the roles and responsibilities within project work groups and the relationship between organisation and culture

ILO 9.   to analyse the fundamental principles underpinning effective teams, motivation and leadership

ILO 10. to be able to differentiate between programme and project management and to evaluate the managerial competencies required for each

ILO 11. to identify and analyse the key management issues that affect the success of programmes

ILO 12. to demonstrate a critical application/analysis of current problems in the execution of programmes especially in the context of Defence related programmes

ILO 13. to demonstrate their ability to synthesize qualitative and quantitative data from theory and practice to reach conclusions and implementable solutions

ILO 14. students will be required to exercise initiative in developing and scoping suitable projects /programmes and carrying them out in a real-world context

ILO 15. the various activities during the programme and the work in group projects will help students develop interpersonal skills including team working, the ability to make and argue their case, presentation skills both written and oral, individually and in teams, and interaction skills

C. MSc

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

ILO 16. to integrate their learning from the PgCert and PgDip and apply it to a research topic appropriate to their organisation

ILO 17. to critically evaluate the techniques and literature applicable to their own research and scholarship

ILO 18. to make professional judgements about how established techniques of enquiry are used to create and interpret knowledge that is applicable to a practical context

4. How is the course taught?

Each of the course modules is delivered via two, 2 ½-days residential workshops at Cranfield Defence and Security which is based at the Defence Academy of the United Kingdom in Shrivenham.

Students will be supported in their learning and personal development by a varied and stimulating learning environment. A typical session will consist of a mix of formal lectures, in-class case discussions, scenario simulation and role-play, 'hot-topic' debate, group work and self-study. Group project work, reflective practice, and class exercises are used to develop problem solving and communication skills. Additional practical expertise will be provided through visiting lecturers

and guest speakers. Demonstrations, role plays and simulations are also part of the learning experience.

Assessments for the course come in the form of written coursework and presentations. All pieces of coursework for all modules on the MSc have a submission deadline of 1100hrs.

Students have access to the extensive library and on-line facilities both at Shrivenham and at the Management Information and Resources Centre at the School of Management. Students are encouraged to make regular contact by e-mail or phone with the relevant module leader. During the thesis phase, students are encouraged to meet with supervisors at least twice per six month cycle.

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 below. 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 1-4	15 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:	
Modules 1-8	15 credits per module
ELECTIVE MODULES:	
N/A	
TOTAL:	120

4

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 1-8	120
Module 9 Research Methods	15
Module 10 Thesis	65
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:
  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);

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[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%).

- 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 expected to complete the course within 3 years. Whilst students are registered for five years, the normal time to complete the course is three. The first four modules are delivered in year 1 (Certificate level) and the next four modules are delivered in year 2 (Diploma level). Year 3 is set aside for the final module on Research Methods and for students to work on their thesis. To achieve the award of Diploma the Certificate level must be completed successfully. To be considered for the award of MSc the Certificate and Diploma must be completed successfully.

Due to the size of the cohort students will be split into Group A and Group B at the first workshop. Group A students should attend all future 'A' workshops and Group B should attend all future 'B' workshops.

6

Course modules

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

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[7] - 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 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-PPM-FPPM R-PPM-FPPM2	Foundations of Programme and Project Management		40	Vari able	15	N	[]	[]	]	40% 40%	ICW ICW	80 20					[]	[]
2	R-PPM-BCFM R-PPM-BCFM2	Business Case and Financial Management		40	Vari able	15	N	[]	[]	]	40% 40%	GCW ICW	80 20					[]	[]

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[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: CW – Coursework; EX – Examination; GPRES – Group Presentation; OR- Viva Voce examination; PRAC – practical; GPREP report on group exercise; THESIS - thesis

Programme and Project Management COURSE SPECIFICATION

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					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 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	R-PPM-PC / R-PPM-PC2	Planning, Control and Performance Management		40	Variable	15	N	[]	[]	[]	40% / 40%	ICW / GCW	70 / 30				[]	[]
4	R-PPM-ROM / R-PPM-ROM2	Risk and Uncertainty Management		40	Variable	15	N	[]	[]	[]	40%	ICW	100				[]	[]
5	R-PPM-OI / R-PPM-OI2	The Reflective Manager: The Craft of Managing Projects and Programmes		40	Variable	15	N	[]	[]	[]	40% / 40%	ICW / ICW	50 / 50				[]	[]
6	R-PPM-SCSM	Supply Chain and Strategic Management		40	Variable	15	N	[]	[]	[]	40%	ICW	50				[]	[]

Assessment Types: CW – Coursework; EX – Examination; GPRES – Group Presentation; OR- Viva Voce examination; PRAC – practical; GPREP report on group exercise; 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
	R-PPM-SCSM2										40%	ICW	50					
7	R-PPM-LTCOL R-PPM-LTCOL2	Organisational Learning and Leading Transformational Change		40	Variable	15	N	[]	[]	[]	40% 40%	ICW ICW	50 50				[]	[]
8	R-PPM -AP	Group Action Project		40	Variable	15	N	[]	[]	[]	40% 40%	GCW ICW	85 15				[]	[]
9	R-PPM-RM R-PPM-RM2	Research Methods and Developing Personal Performance		40	Variable	15	N	[]	[]	[]	50% 50%	ICW ICW	20 80				[]	[]
10	R-PPM-DISS	Thesis		0	0	65	N	[]	[]	[]	50%	THESIS	100				[]	[]

Assessment Types: CW – Coursework; EX – Examination; GPRES – Group Presentation; OR- Viva Voce examination; PRAC – practical; GPREP report on group exercise; THESIS - thesis

Programme and Project Management COURSE SPECIFICATION
QA&E Version: 3.0 October 2017   Course/SAS Version 1.4

7. **How are the ILOs assessed?**

The course uses a range of assessment types. Students can expect to have a mixture of individual and group written assessments and presentations with a final thesis dissertation.

This approach has been adopted in order to create a fit with the module contents, the mix assessment approaches and to enable formative assessment (with feedback, for instance, supporting students in their group projects and theses work).

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.	ILO1	ILO2	ILO3	ILO4	ILO5	ILO6			
1	ICW	ICW	ICW			ICW			
2	GCW		GCW	ICW	ICW				
3		ICW		ICW		GWC			
4			ICW	ICW		ICW			

B. PgDip

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

Award ILOs / Module No.	ILO7	ILO8	ILO9	ILO10	ILO11	ILO12	ILO13	ILO14	ILO15
5		ICW	ICW		ICW	ICW			
6	ICW	ICW		ICW	ICW				
7	ICW	ICW		ICW		ICW	ICW		
8	ICW		ICW	ICW			GWC	GWC	GWC

C. MSc

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

Award ILOs Module No.	ILO16	ILO17	ILO18						
9	ICW	ICW							
10	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: 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 was originally developed in response to the Ministry of Defence's need for quality project and programme personnel. Central funding was available for MOD civilians and military personnel each year. The anticipation was that the students would move to project/programme management roles upon completion of the course. The MOD have recognised the benefits from previous graduates and have identified PPM as a key skill by increasing the number of students they sponsor on the course.

Cranfield University and this programme also provide opportunities for you to network with fellow professionals, leading figures from industry and academic experts.

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 Renewable Energy Engineering

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

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1. What is the course?

Course information

Course Title	Renewable Energy Engineering
Course code	MSREEFTC, MSREEPTC, PDREEFTC, PDREEPTC, PCREEFTC, PCREEPTC
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 Offshore Renewable Energy Engineering
Programme Director **Course Director**	Dr Gill Drew Dr Taka Nishino, Dr Mahmood Shafiee (Deputy course director)
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

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[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

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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 Offshore Renewable Energy Engineering (OREE) where the research interests include:

Hydrostatic, Hydrodynamic and aerodynamic design, analysis and testing of novel wind, wave and tidal energy conversion devices
Structural Intergrity of offshore structures including inspection and testing
Naval architecture
Computational Fluid Dynamics (CFD)
Finite Element Analysis (FEA)

The OREE Centre has access to impressive materials and fatigue testing facilities, large wave tanks for hydrodynamic experiments as well as wind tunnels.

Teaching and assessment is also provided by the 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 is accredited by the Institution of Mechanical Engineers (IMechE) until 2019.

2. What are the aims of the course?

Cranfield University offers this course in order to provide engineering and applied science graduates with the advanced interdisciplinary skills required to design, optimise and evaluate the technical and economic viability of renewable energy schemes. The objective is thus to develop suitably trained and qualified engineers, capable of contributing significantly to the increased demand for renewable energy technologies.

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

The course will be suitable for aeronautical, mechanical and electrical engineering graduates or related science degrees, keen to specialise in renewable energy power generation applications. Graduates currently in employment keen to extend their qualifications or to pursue a career change.

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

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

A. PgCert in Renewable Energy Engineering

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

ILO 1.   Critically evaluate current theory and practice of renewable energy conversion systems

ILO 2.   Review and assess the technical and economic issues involved in the design and operation of renewable energy conversion systems

ILO 3.   Systematically assess and apply the use of a range of software employed for modelling, optimisation and control of renewable energy conversion systems

ILO 4.   Critically assess current developments in selected principle topics in the area of renewable energy conversion systems

B. PgDip in Renewable Energy Engineering

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

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

C. MSc in Renewable Energy Engineering

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:

A dedicated electronic Blackboard site
Practical workshops in:
MATLAB training
Commercial CFD package
Commercial FEA package
Wave tank and wind tunnel testing
Arrangement of attendance of relevant modules offered by other MSc courses.

The taught programme is generally delivered from October to February. Each module is generally delivered over one to two weeks.

The group project is delivered between February and April. Each group will typically include 4-6 students and an academic supervisor will be assigned to each group. A formal project review meeting will be held on a weekly basis. All students taking the group project (i.e. both full-time and part-time) are required to participate in at least 80% of the weekly project review meetings. Additionally, it is expected that students will be responsible to ensure that these meetings are used to good effect, and that appropriate minutes are taken and findings reported to the academic supervisor. Students are allowed to use tele-conferencing, video-conferencing and web-conferencing facilities to participate in the group project review meetings i.e. they're not always required to attend in person. This will afford students with the experience of working within a disperse project team. However, all students will be required to attend in person the initial and final project review meetings.

Part-time students have the option of completing a dissertation as an alternative to the Group Project. Students opting for the part-time dissertation will be assigned a supervisor by the Course Director and will agree with the supervisor an appropriate topic of study. This may be related to a workplace/industrial activity that is relevant to the student's work environment. The dissertation will include a comprehensive review of classical and contemporary related material and also a discussion and properly argued conclusions. Where appropriate the dissertation will acknowledge the work and contribution of others. The dissertation module will be assessed in a similar way to the group project by presentation and formal report.

The individual research project is typically delivered between May and September. Each student is allocated an academic supervisor who will guide and assess the students work. Again, it is expected that a formal weekly review meeting will occur at which the students will provide a brief presentation on the work performed to date and record minutes and arising 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:	
Dynamics of Fluidic Energy Devices	10
Risk and Reliability Engineering	10
Structural Integrity	10
Management for Technology	10
ELECTIVE MODULES:	
Select 2 modules from the remaining 4 taught modules:	
Power Electronics and Machines	10

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Engineering Stress Analysis: Theory and Simulations	10
Computational Fluid Dynamics for Renewable Energy	10
Testing & Routes to Certification	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:	
Dynamics of Fluidic Energy Devices	10
Risk and Reliability Engineering	10
Structural Integrity	10
Management for Technology	10
Engineering Stress Analysis	10
Computational Fluid Dynamics for Renewable Energy	10
Power Electronics and Machines	10
Testing and Routes to Certification	10
Group project (Compulsory for 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:	
Dynamics of Fluidic Energy Devices	10
Risk and Reliability Engineering	10
Structural Integrity	10
Management for Technology	10
Engineering Stress Analysis	10
Computational Fluid Dynamics for Renewable Energy	10
Power Electronics and Machines	10
Testing and Routes to Certification	10
Group project (compulsory for Full Time students)	40
Individual research 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 <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>

Students register for the course in October and Full Time students are expected to complete the course within 12 calendar months. This course is also offered on a part-time basis. Part Time students are expected to complete the course in 3 years. Students would instead attend the

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[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%).

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required modules of the taught component according to a schedule agreed with the Course Director. Part-time students taking the group project would still be expected to complete this within a 7 month period, the same as for full-time students.

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, and completion of assignments.

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	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-REE-DFED	Dynamics of Fluidic Energy Devices	T Nishino	30		10	N		09/10/17	13/10/17	40	ICW	100				FT 28/10/17 PT 11/11/17	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

Renewable Energy Engineering COURSE SPECIFICATION
QA&E USE ONLY: Version 4.1 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 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	N-REE-PEM	Power Electronics and Machines	P Luk	30		10	N		30/10/17	03/11/17	40	EX	100				w/c 11/12/17	10-14/09/18
4	N-AME-RR Occ A	Risk and Reliability Engineering	A Kolios	30		10	Y		13/11/17	17/11/17	40	EX	100				w/c 1/1/18	10-14/09/18
5	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
6	N-REE-CFDR	Computational Fluid Dynamics for Renewable Energy	T Nishino	30		10	Y		04/12/17	08/12/17	40	ICW	100				FT 20/1/18 PT 3/2/18	July 18
7	N-REE-TRC	Testing & Routes to Certification	F Trarieux	18		10	Y		29/01/18	02/02/18	40	ICW	100				FT 17/2/18 PT 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

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
8	N-AME-SI	Structural Integrity	A Mehmanparast	38.5		10	Y		05/02/18	09/02/18	40	EX	100				w/c 19/2/18	10-14/09/18
9	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
10	I-ENE-GRPP Occ A	Group Project	G Drew	16		40	Y		05/03/18	04/05/18	50 50	GPROJ ICW	80 20				01/05/18 11/05/18	
11	I-ENE-DISS Occ A	Dissertation (part-time option)	G Drew	10		40	Y		02/10/17	29/09/18	50	IPROJ IPRES	80 20				28/09/18 28/09/18	
12	I-ENE-THESIS Occ A	Individual Research Project	G Drew	20		80	Y		07/05/18	07/09/18	50 50	THESIS OR	90 10				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

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-SI	Structural Integrity	Advanced Mechanical Engineering	• Flow Assurance for Oil and Gas Production • Design of Rotating Machines • 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 • Safety & Accident Investigation • Renewable Energy Engineering • REMS EngD
N-AME-RR	Risk and Reliability Engineering	Advanced Mechanical Engineering	• Flow Assurance for Oil and Gas Production • Process Systems Engineering • Renewable Energy Engineering • REMS EngD • Process Systems Engineering (Muscat)
N-AME-ESA	Engineering Stress Analysis: Theory and Simulations	Advanced Mechanical Engineering	• Design of Rotating Machines • 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 Subsea Engineering

			• Offshore and Ocean Technology With Offshore Renewable Energy • Renewable Energy Engineering • REMS EngD
N-REE-CFDR	Computational Fluid Dynamics for Renewable Energy	Renewable Energy Engineering	• REMS EngD
N-REE-TRC	Testing and Routes to Certification	Renewable Energy Engineering	• 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 Subsea Engineering • Offshore and Ocean Technology with Materials Engineering • Offshore and Ocean Technology with Risk Management • Offshore and Ocean Technology with Pipeline Engineering • Offshore and Ocean Technology with Renewable Energy • 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

This approach has been adopted because:

This is the standard criteria of assignment in SWEE.

Assessment and ILO Mapping

A. PgCert

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

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 5
10	GPROJ ICW
11	IPROJ IPRES

C. MSc

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

Award ILOs / Module No.	ILO 6	ILO 7
12	THESIS OR	THESIS OR

CROSS-MODULAR ASSESSMENT (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>

The objective of this course is to develop suitably trained and qualified engineers in the field of renewable energy capable of contributing significantly to the increased demand for renewable energy technologies. This course will equip graduates with the advanced interdisciplinary skills required to design, optimise and evaluate the technical and economic viability of renewable energy schemes.

PROGRAMME SPECIFICATION OF STRUCTURED TAUGHT ELEMENT ONLY

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.

PROGRAMME TITLE: Renewable Energy Marine Structures (REMS) EngD

Date of first publication/latest revision: October 2014 – August 2017

1. What is the programme?

Programme information for Structured Taught Element only

Programme Title	Renewable Energy Marine Structures (REMS) EngD
Course code	DEREMFRC, DPREMFRC
Academic Year	2017/18
Valid entry routes	EngD & PhD
Additional exit routes	PhD, MPhil, MSc by Research
Mode of delivery	Full-time
Location(s)[1] of Study	Cranfield University and Oxford University
School(s)	School of Water, Energy and Environment and School of Aerospace, Transport and Manufacturing
Theme	Energy and Power and Manufacturing
Centre	Centre for Offshore Renewable Energy Engineering
Programme Director	Dr Ali Mehmanparast
Awarding Body	Cranfield University and Oxford University
Is this an AP Contract course?[2]	No
Teaching Institution	Cranfield University
Admissions body	Cranfield University and Oxford University
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ Level 8
Benchmark Statement(s)	Not Applicable
Registration Period(s)	4 years Full-Time

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[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

Renewable Energy Marine Structures (REMS) EngD COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 September 2017   Course / SAS Version: 1.1. 10 March 2017

available	
Programme Start Month(s)	October

Institutions delivering the programme

This programme is delivered by the School of Water, Energy and Environment, Energy and Power Theme, Centre for Offshore Renewable Energy Engineering and the School of Aerospace, Transport and Manufacturing, Manufacturing Theme where the research interests include:

- Structural Integrity and Manufacturing

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

- Oxford University in the Centre Management Meetings

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

2. What are the aims of the course?

REMS is an EPSRC funded centre aiming to train fifty Engineering Doctorate (EngD) and PhD students over an eight-year period, admitting ten new students each year for five years started in October 2014. This is a collaborative partnership between Cranfield University and the University of Oxford.

A student registering for an EngD spends four years attending a structured programme of taught modules, group project and Transferable Skills for Engineering Leadership sessions and will complete a PhD-level thesis or portfolio of work. Research Projects will usually be supervised by at least one academic based at one of the two universities and an industry mentor/supervisor.

A student registering for a PhD spends three years to complete a PhD-level thesis or portfolio of work. Research Projects will usually be supervised by at least one academic based at one of the two universities and an industry mentor/supervisor.

3. What do students need to achieve in order to complete the programme?

For EngD students, the accumulation of 120 credits is required to complete the programme through the assessment of taught modules as detailed below.

PhD students are not required to complete any assessed modules.

Part-time study is not an option for this programme.

Description	Credits
COMPULSORY MODULES:	
Fluid Mechanics and Loading	10
Offshore Inspection	10
Renewable Technologies: Fundamentals	0
Risk and Reliability Engineering	10
Engineering Stress Analysis: Theory & Simulations	10
Group Project	40
ELECTIVE MODULES:	

Renewable Energy Marine Structures (REMS) EngD COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 September 2017   Course / SAS Version: 1.1. 10 March 2017

4 Modules from the following modules:	40
Introduction to Offshore Geotechnics Numerical Analysis for Offshore Geotechnics Principles of Sustainability Environmental Risks: Hazard, Assessment and Management Design of Welded Structures Materials in the Offshore Environment GIS Fundamentals Composites Manufacturing for High Performance Structures Advanced Control Systems Aquatic Ecosystems Advanced Welding Processes Technology, Environment and Society Testing and Routes to Certification Structural Integrity Management for Technology Offshore Foundation Design	
TOTAL:	120

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);

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[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%).

- 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).

3. <u>How is the programme structured?</u>

EngD students register for the programme in October and are expected to complete the programme within 48 calendar months.5 modules (each taught over a week), chosen by the REMS CDT management committee, will be taken during the induction term - 4 of which are assessed and one which is attendance only.
2 elective modules will be taken by students in Year 2
2 elective modules will be taken in year 3.

PhD students register for the programme in October and are expected to complete the programme within 36 calendar months. There is no requirement for them to attend modules or complete assessments.

Programme Taught 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%	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	N-AME-FML	Fluid Mechanics and Loading	Dr Maurizio Collu	30		10	Y		9/10/17	13/10/17	50	ICW	100				28/10/2017	July 2018
14	N-AME-RR Occ A	Risk and Reliability Engineering	Dr Athanasios Kolios	30		10	Y		13/11/17	17/11/17	50	EX	100				w/c 1/1/2018	w/c 10/9/2018
8	I-OOT-A1079	Offshore Inspection	Dr Mahmood Shafiee	32		10	Y		23/10/17	27/10/17	50	ICW	100				4/11/2017	July 2018
15	N-AME-ESA	Engineering Stress Analysis: Theory & Simulations	Dr Ali Mehmanparast	32		10	Y		28/11/16 27/11/17	1/12/17	50	ICW	100				2/1/2018	July 2018
10	I-MES-RTFA	Renewable Energy Technologies: Fundamentals	Dr Stuart Wagland	30		0	Y		30/10/17	3/11/17	N/A	AO	N/A				N/A	N/A

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[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.

Renewable Energy Marine Structures (REMS) EngD COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 September 2017   Course / SAS Version: 1.1. 10 March 2017

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
1	I-REM-IOG	Introduction to Offshore Geotechnics	Dr Ali Mehmanparast	32	32	10	N		23/10/17	27/10/17	50			100	ICW EX	30 70	4/11/2017 w/c 11/12/17	July 18
22	I-REM-OFD	Offshore Foundation Design	Dr Ali Mehmanparast	30	27	10	N		23/4/18	27/4/18	50			100 MULTI	ICW EX	30 70	6/5/18 w/c 10/9/18	Jan 2019
2	I-REM-NAG	Numerical Analysis for Offshore Geotechnics	Dr Ali Mehmanparast	30	30	10	N		25/9/17	29/9/17	50	ICW	100				7/10/2017	w/c 11/12/17
11	I-MAT-A1013	Composites Manufacturing for High Performance Structures	Andrew Mills	35		10	Y		30/10/17	3/11/17	50	ICW	100				1/12/17	July 2018
16	I-WEE-A1110	Advanced Welding Processes	Dr Wojciech Suder	32		10	Y		27/11/17	1/12/17	50	EX	100				w/c 5/2/18	July 2018
6	I-WEE-A1101	Design of Welded Structures	Dr Paul Colegrove	20		10	Y		16/10/17	20/10/17	50	EX	100				w/c 2/1/2018	July 2018
19	N-AME-SI	Structural Integrity	Dr Ali Mehmanparast	38.5	6	10	Y		5/2/18	9/2/18	50	EX	100				w/c 19/2/2018	w/c 10/9/2018
7	I-OOT-A1078	Materials in the Offshore Environment	Dr Joy Sumner	32		10	Y		16/10/17	20/10/17	50	EX	100				w/c 2/1/2018	w/c 10/9/

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
																		2018
18	N-REE-TRC	Testing and Routes to Certification	Dr Florent Trarieux	18		10	Y		29/1/18	2/2/18	50	ICW	100				17/2/2018	July 2018
12	N-PSE-ACS Occ A	Advanced Control Systems	Dr Yi Cao	30		10	Y		6/11/17	10/11/17	50	ICW	100				2/12/2017	July 2018
13	I-ILE-AEL	Aquatic Ecosystems	Dr B Grabowski	30		10	Y		6/11/17	10/11/17	50	ICW	100				18/11/2017	July 2018
9	I-GIM-A1131	GIS Fundamentals	Dr Tim Brewer	42		10	Y		23/10/17	27/10/17	50	ICW	100				4/11/2017	July 2018
4	I-EMB-A1122	Principles of Sustainability	Dr Paul Burgess	26		10	Y		9/10/17	13/10/17	50	ICW	100				12/10/2017	July 2018
17	I-EMB-A1128	Technology, Environment and Society	Dr Phil Longhurst	25		10	Y		22/1/18	26/1/18	50	ICW	100				3/2/2018	July 2018
5	I-ERM-A2005	Environmental Risks: Hazard, Assessment and Management	Dr Simon Jude	24.5		10	Y		9/10/17	13/10/17	50	ICW	100				21/10/2017	July 2018
20	G-MTI Occ A	Management for Technology	Stephen Carver	50		10	Y		26/2/18	2/3/18	50	EX GCW	50 50				w/c 19/3/2018 10/3/201	w/c 10/9/ 2018 July

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
																	8	2018
21	I-REM-GRPP	Group Project	Prof Feargal Brennan	20		40	N		26/2/18	4/5/18	50	IPRES ICW	30 70				1/5/18 5/5/2018	July 2018

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-FML	Fluid Mechanics and Loading	Advanced Mechanical Engineering	• REMS EngD
N-AME-RR	Risk and Reliability Engineering	Advanced Mechanical Engineering	• Flow Assurance for Oil and Gas Production; • Process Systems Engineering; • Renewable Energy Engineering • REMS EngD
I-OOT-A1079	Offshore Inspection	Offshore and Ocean Technology	• REMS EngD
N-AME-ESA	Engineering Stress Analysis: Theory & Simulations	Advanced Mechanical Engineering	• Design of Rotating Machines; • Offshore and Ocean Technology with Offshore Materials Engineering; • Offshore and Ocean Technology with Pipeline Engineering; • Offshore and Ocean Technology with Renewable Energy; • Offshore and Ocean Technology with Risk Management; • Offshore and Ocean Technology with Subsea engineering; • Renewable Energy Engineering • REMS EngD
I-MES-RTFA	Renewable Energy Technologies; Fundamentals	Renewable Energy Technology	• REMS EngD • Cleantech Entrepreneurship
I-MAT-A1013	Composites Manufacturing for High Performance Structures	Advanced Materials	• Aerospace Manufacturing, • Aerospace Materials, • Manufacturing Technology and Management; • Safety and Accident Investigation (Marine) • REMS EngD
I-WEE-A1110	Advanced Welding Processes	Welding Engineering	• Aerospace Manufacturing; • Manufacturing Technology and Management

			• REMS EngD
I-WEE-A1101	Design of Welded Structures	Welding Engineering	• REMS EngD
N-AME-SI	Structural Integrity	Advanced Mechanical Engineering	• Design of Rotating Machines; • Flow Assurance for Oil and Gas Production; • Materials for Energy Systems; • Offshore and Ocean Technology with Offshore Materials Engineering; • Offshore and Ocean Technology with Pipeline Engineering; • Offshore and Ocean Technology with Renewable Energy; • Offshore and Ocean Technology with Risk Management; • Offshore and Ocean Technology with Subsea engineering; • Renewable Energy Engineering; • Safety and Accident Investigation (Marine); • Safety and Accident Investigation (Rail) • REMS EngD
I-OOT-A1078	Materials in the Offshore Environment	Offshore and Ocean Technology	• REMS EngD
N-REE-TRC	Testing and Routes to Certification	Renewable Energy Engineering	• REMS EngD
N-PSE-ACS	Advanced Control Systems	Process Systems Engineering	• Advanced Mechanical Engineering; • Energy Systems and Thermal Processes: • Flow Assurance for Oil and Gas Production; • Advanced Chemical Engineering • REMS EngD
I-ILE-AEL	Aquatic Ecosystems	Environmental Management for Business	• REMS EngD
I-GIM-A1131	GIS Fundamentals	Geographical Information Management	• Land Reclamation and Restoration • REMS EngD • Safety and Accident Investigation

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-ERM-A2005	Environmental Risks: Hazard, Assessment and Management	Environmental Engineering	• Energy from Waste • 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 Subsea Engineering • Offshore and Ocean Technology with Materials Engineering • Offshore and Ocean Technology with Risk Management • Offshore and Ocean Technology with Pipeline Engineering • Offshore and Ocean Technology with Renewable Energy • 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

4. __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.

5. __What opportunities are graduates likely to have on completing the programme?__

The main aim of the REMS Centre for Doctoral Training is to recruit and train 50 outstanding graduate students who can become future leaders of the emergent offshore renewable energy sector. The graduates from the programme will have the prerequisite knowledge and experience of integrated structural systems to support the developing Offshore and Marine Renewable Energy sector. They are expected to be employed by the UK and global offshore renewable energy sector and get involved in the world-wide development of a new generation of marine structures and support systems for renewable energy.

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 Renewable Energy Technology

Date of first publication/latest revision: 26/01/16 – 09/03/17

1. What is the course?

Course information

Course Title	Renewable Energy Technology
Course code	MSRETFTC, MSRETPTC, PDRETFTC, PDRETPTC, PCRETFTC, PCRETPTC
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 Offshore Renewable Energy Engineering
Programme Director **Course Director**	Dr Gill Drew Dr Takafumi Nishino, Dr Mahmood Shafiee (Deputy course director)
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

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[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, Full-time PgCert - one year, Part-time PgCert - two years, Full-time PgDip - one year, Part-time PgDip - two years
Course Start Month(s)	October

Institutions delivering the course

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

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

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course has not been accredited by any external bodies.* This course, together with other Energy MSc courses, is currently applying for accreditation from Energy Institute (EI).

2. What are the aims of the course?

Cranfield University offers this course in order to:

- Prepare science and engineering graduates to meet the increasing demand of industry, consultancies and the public sector for engineers in the energy production and demand management sectors
- Acquire an advanced theoretical and specialist understanding of processes and practices central to low carbon emissions energy production technologies
- Select and apply appropriate existing and emerging energy production technologies that can achieve lower environmental impacts via an integrated and cross-disciplinary approach
- Enable the application of scientific, technical and engineering principles, economic consequences and risks of energy production technologies options as best practice
- Develop the capacity to undertake successful technical research projects using appropriate methods of critical analysis.

This programme is intended for the following range of students:

- Graduates with science or related engineering degrees keen to pursue careers in renewable energy technologies
- Graduates currently in employment keen to extend their qualifications or to pursue a career change
- Individuals with other qualifications but who possess considerable relevant experience

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

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

A. **Postgraduate Certificate in Renewable Energy Technology**

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

ILO 1. Critically evaluate the key concepts and issues appertaining to the availability and use of renewable energy resources, both offshore and land-based and including waste, together with the engineering principles and technologies that underpin the production, distribution and use of these energy resources.

ILO 2. Discuss the purpose of energy policy, the structure of energy and carbon markets and the need for a systematic range of policy strategies and instruments.

ILO 3. Describe the financial instruments traded within energy and carbon markets and critically evaluate strategies for energy security and sustainability

ILO 4. Apply the principles of maintaining the reliability of energy production and distribution systems and their asset management.

ILO 5. Apply the principles of energy demand as they relate to renewable energy technologies in order to improve and enhance policy development and systems design

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

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

B. Postgraduate Diploma in Renewable Energy Technology

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 Renewable Energy Technology

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?

4

The MSc course will be 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.

The Group Projects are founded on group-based research programmes typically undertaken between February and April. The projects are designed to integrate knowledge, understanding and skills from the taught modules in a real-life situation.

The thesis project, typically delivered between May and September, further develops research and project management skills that: provide the ability to think and work in an original way; contribute to knowledge; overcome genuine problems; and communicate through a thesis and oral exam. Each student is allocated a supervisor, who will guide and assess the student work.

Guidance sessions are provided as to what is required from thesis and oral presentation.

Within induction week, students will be introduced to personal development planning and asked to reflect on their transferable skills and to take ownership of their personal development during the course.

The PgDip course consists of two of these sections: taught modules (66.7%) and group projects (33.3%).

The PgCert course consists of one of these sections: taught modules (100%). Candidates are required to pass three compulsory modules and three optional modules (out of the eight taught modules).

5. __What do students need to achieve in order to graduate?__

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 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:	
Environmental Valuation Renewable Energy Technologies: Fundamentals Renewable Energy Technologies – Design Case Studies	10 10 10
ELECTIVE MODULES:	
Three modules selected from modules:	

5

Principles of Sustainability	10
Energy from Biomass and Waste: Thermochemical Processes	10
Energy Production, Emissions Control, Carbon Capture and Transport	10
Renewable Energy Technologies: Systems	10
Management for Technology	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:	
Environmental Valuation	10
Renewable Energy Technologies: Fundamentals	10
Renewable Energy Technologies – Design Case Studies	10
Principles of Sustainability	10
Energy from Biomass and Waste: Thermochemical Processes	10
Energy Production, Emissions Control, Carbon Capture and Transport	10
Renewable Energy Technologies: Systems	10
Management for Technology	10
Group project (Compulsory for full time students)*	40
ELECTIVE MODULES:	
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:	
Environmental Valuation	10
Renewable Energy Technologies: Fundamentals	10
Renewable Energy Technologies – Design Case Studies	10
Principles of Sustainability	10
Energy from Biomass and Waste: Thermochemical Processes	10
Energy Production, Emissions Control, Carbon Capture and Transport	10
Renewable Energy Technologies: Systems	10
Management for Technology	

Group Project (Compulsory for full time students)* Individual thesis project	40 80
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	 40 40
TOTAL:	200

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

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

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

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

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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. How is the course structured?

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

All options are also offered on a part-time basis and such students are expected to complete the course within 2 to 3 years.

8

Course modules

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

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			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	I-EMB-A1122	Principles of Sustainability	P. Burgess	26		10	Y		09/10/17	13/10/17	40	ICW	100				FT 21/10/17 PT 4/11/17	W/c 4/6/18
3	I-EEM-A1184	Environmental Valuation	N. Ozkan	27		10	Y		23/10/17	27/10/17	40	ICW	100				FT 4/11/17 PT 18/11/17	w/c 4/6/18

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[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
4	I-MES-RETF	Renewable Energy Technologies: Fundamentals	S. Wagland	30		10	Y		30/10/17	03/11/17	40	ICW	100				FT 18/11/17 PT 2/12/17	July 18
5	N-BPE-EFB	Energy from Biomass and Waste: Thermochemical Processes	B Fidalgo Fernandez	30		10	Y		20/11/17	24/11/17	40	EX	100				w/c 1/1/18	10-14/09/18
6	I-MES-A2033 Occ A	Energy Production, Emissions Control, Carbon Capture and Transport	K. Patchigolla	30		10	Y		15/01/18	19/01/18	40			100	ICW IPRES	50 50	ICW FT 3/2/18 ICW PT 17/2/18 IPRES w/c 15/1/18	July 18
7	I-MES-RETS Occ A	Renewable Energy Technologies: Systems	G. Di Lorenzo	21		10	Y		29/01/18	02/02/18	40	ICW	100				FT 24/2/18 PT 10/3/18	July 18
8	I-MES-A2031	Renewable Energy	S. Wagland	22		10	Y		05/02/18	09/02/18	40			100	GPRES ICW	25 75	GPRES	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 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 – Design Case Studies															9/2/18 ICW FT 3/8/18 ICW PT 17/3/18	
9	G-MTI Occ A	Management for Technology	S. Carver	50		10	Y		26/02/18	02/03/18	40	EX GCW	50 50				EX w/c 19/3/18 GCW FT 10/3/18 GCW PT 24/3/18	10-14/09/18 July 18
10	I-ENE-GRPP Occ A	Group Project	G Drew	16		40	Y		05/03/18	04/05/18	50 50	GPROJ ICW	80 20				01/05/18 11/05/18	
11	I-ENE-DISS Occ A	Dissertation (Part-Time students only)	G Drew	10		40	Y		02/10/17	29/09/18	50	IPROJ IPRES	80 20				28/09/18 28/09/18	
12	I-ENE-THESIS	Individual Research Project	G Drew	20		80	Y		07/05/18	07/09/18	50 50	THESIS OR	90 10				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

Renewable Energy Technology COURSE SPECIFICATION
QA&E USE ONLY: Version 4.1 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	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																	

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

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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-A1122	Principles of Sustainability	Environmental Management for Business	• Land Reclamation and Restoration • Future Food Sustainability • REMS EngD • Renewable Energy Technology
I-MES-A2033	Energy Production, Emissions Control, Carbon Capture and Storage	Energy Systems and Thermal Processes	• Atmospheric Emission Technology • Renewable Energy Technology • Cleantech Entrepreneurship
N-BPE-EFB	Energy from Biomass and Waste: Thermochemical Processes	Advanced Chemical Engineering (Biofuels Route)	• Energy from Waste • Renewable Energy Technology
I-EEM-A1184	Environmental Valuation	Environmental Management for Business	• Renewable Energy Technology
I-MES-RETF	Renewable Energy Technologies: Fundamentals	Renewable Energy Technology	• Geothermal Engineering
I-MES-RETS	Renewable Energy Technologies: Systems	Renewable Energy Technology	• Energy Systems and Thermal Processes • Energy Systems & Thermal Processes (Muscat)
I-MES-A2031	Renewable Energy Technologies: Design Case Study	Renewable Energy Technology	• Energy from Waste
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 Subsea Engineering • Offshore and Ocean Technology with Materials Engineering • Offshore and Ocean Technology with Risk Management

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				• Offshore and Ocean Technology with Pipeline Engineering • Offshore and Ocean Technology with Renewable Energy • 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 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) or examination.
- the group project (20%) is assessed by means of a written group report and an oral presentation.
- the research project (40%), is assessed by means of a thesis and an oral examination

Assessment and ILO Mapping

A. PgCert

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		ICW	ICW			ICW	ICW
4	ICW	ICW		ICW	ICW	ICW	ICW
5	EX					EX	
6	ICW IPRES					ICW IPRES	ICW IPRES
7	ICW	ICW		ICW	ICW	ICW	ICW
8	GPRES	GPRES		GPRES	GPRES	GPRES	GPRES

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

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 8
10	GPROJ ICW
11	IPROJ IPRES

C. MSc

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

Award ILOs / Module No.	ILO 9	ILO 10
12	THESIS OR	THESIS OR

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

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

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who acts as

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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 will have a broad knowledge, network and increased opportunities for individual specialism in their chosen career in the energy production and management industries.

COURSE SPECIFICATION

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

COURSE TITLE:	MSc in Safety and Accident Investigation

Date of first publication/latest revision:	September 2017

1. What is the course?

Course information

Course Title	MSc in Safety and Accident Investigation (Air Transport) MSc in Safety and Accident Investigation (Marine Transport) MSc in Safety and Accident Investigation (Rail Transport)
Course code	MSSAIPTC, PDSAIPTC, PCSAIPTC – Safety and Accident Investigation (Air Transport) MSSAMPTC, PDSAMPTC, PCSAMPTC – Safety and Accident Investigation (Marine Transport) MSRAIPTC, PDRAIPTC, PCRAIPTC – Safety and Accident Investigation (Rail Transport)
Academic Year	2017/18
Valid entry routes	MSc in Safety and Accident Investigation (Air Transport) MSc in Safety and Accident Investigation (Marine Transport) MSc in Safety and Accident Investigation (Rail Transport) PgDip in Safety and Accident Investigation (Air Transport) PgDip in Safety and Accident Investigation (Marine Transport) PgDip in Safety and Accident Investigation (Rail Transport) PgCert in Safety and Accident Investigation (Air Transport) PgCert in Safety and Accident Investigation (Marine Transport) PgCert in Safety and Accident Investigation (Rail Transport)
Additional exit routes	Not Applicable
Mode of delivery	Part-time
Location of Study	Cranfield University
School(s)	School of Aerospace, Transport and Manufacturing
Theme	Transport Systems
Centre	Centre for Safety and Accident Investigation
Course Director	Saryani Asmayawati
Awarding Body	Cranfield University
Teaching Institution	Cranfield University

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Admissions body	Cranfield University
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	Not Applicable
Registration Period(s) available	Part-time MSc - up to three years, Part-time PgDip - two years, Part-time PgCert - two years
Course Start Month(s)	January or May

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

- Safety Management
- Accident Investigation
- Risk Management

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

Teaching and assessment is also provided by other centres in the School of Aerospace, Transport and Manufacturing, School of Water, Energy and Environment, and by the Cranfield Forensic Institute, Shrivenham.

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 not currently accredited.

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

MSc in Safety and Accident Investigation (Air Transport):
The aim of the course is to provide students with the knowledge and skills to conduct an aircraft accident investigation in accordance with the standards and recommended practices as inferred by the appropriate guidelines and legislations, including:

- Collection and preservation of evidence
- Health and safety of themselves and others on the accident site
- Scientific analysis of causes of accidents
- Preparation of defensible and practicable recommendations
- Dissemination of findings and safety promotion

Postgraduate Diploma (PGDip) and Postgraduate Certificate (PGCert) entry routes are provided for students who wish to access only parts of the course provided. It is also suggested that the latter two qualifications may be more appropriate for those in the aviation or related industries who have no need for a separate Individual Research Project.

MSc in Safety and Accident Investigation (Marine Transport):

The aim of the course is to provide students with the knowledge and skills to conduct a marine accident investigation in accordance with the standards and recommended practices as inferred by the appropriate guidelines and legislations, including:

- Collection and preservation of evidence
- Health and safety of themselves and others on the accident site
- Scientific analysis of causes of accidents
- Preparation of defensible and practicable recommendations
- Dissemination of findings and safety promotion

Postgraduate Diploma (PGDip) and Postgraduate Certificate (PGCert) entry routes are provided for students who wish to access only parts of the course provided. It is also suggested that the latter two qualifications may be more appropriate for those in the marine or related industries who have no need for a separate Individual Research Project.

MSc in Safety and Accident Investigation (Rail Transport):
The aim of the proposed course is to provide students with the knowledge and skills to conduct a rail accident investigation in accordance with the standards and recommended practices as inferred by the appropriate guidelines and legislations, including:

- Collection and preservation of evidence
- Health and safety of themselves and others on the accident site
- Scientific analysis of causes of accidents
- Preparation of defensible and practicable recommendations
- Dissemination of findings and safety promotion

Postgraduate Diploma (PgDip) and Postgraduate Certificate (PgCert) entry routes are provided for students who wish to access only parts of the course provided. It is also suggested that the latter two qualifications may be more appropriate for those in the rail industry who have no need for a separate Individual Research Project.

This programme is intended for the following range of students:

MSc in Safety and Accident Investigation (Air Transport):
- Those with a technical or operational background in air transport
- Those employed as accident investigators
- Those employed in operational safety management
- Other employment sources including military, regulators and manufacturers

MSc in Safety and Accident Investigation (Marine Transport):
- Those with a technical or operational background in marine transport
- Those employed as accident investigators
- Those employed in operational safety management
- Other employment sources including military, regulators and manufacturers

MSc in Safety and Accident Investigation (Rail Transport):
- Those with a technical or operational background in rail transport
- Those employed as accident investigators
- Those employed in operational safety management
- Other employment sources including military, regulators and manufacturers

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

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

A. Postgraduate Certificate in Safety and Accident Investigation (Air Transport)

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

ILO 1.a   Demonstrate a fundamental understanding of, and the application thereof to current problems, the process of transport accident investigation including preparation, emergency response, evidence collection, analysis, report writing and making recommendations;

ILO 2.a   Understand the statutory obligations of an accident investigator and the competing interests of agencies including the police, Coroner, regulator, operator and manufacturer and incorporate these in investigation processes;

ILO 3.a   Identify the evidence sources that may be available to an investigation and personally demonstrate how to collect, preserve and interpret them;

ILO 4.a   Examine major accident investigation case studies and critically evaluate their relevance to investigation techniques and aviation safety;

ILO 5.a   Critically analyse evidence collected during an investigation, draw conclusions and make recommendations that do not lay blame, are replicable, logical and of sufficient scientific rigour;

ILO 6.a   Plan, organise and conduct an accident investigation, on site with due regard to personal safety, evidence preservation, ethics and rigour;

ILO 7.a   Appraise and use appropriate techniques for the analysis of evidence;

ILO 8.a   Work as part of an accident investigation team with an understanding of the various roles of other team members;

ILO 9.a   Compose an accident report in accordance with the structure laid out in national or regional standards;

ILO 10.a   Plan and conduct effective presentations of their findings.

B. Postgraduate Certificate in Safety and Accident Investigation (Marine Transport)

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

ILO 1.b   Demonstrate a fundamental understanding of, and the application thereof to current problems, the process of transport accident investigation including preparation, emergency response, evidence collection, analysis, report writing and making recommendations;

ILO 2.b   Understand the statutory obligations of an accident investigator and the competing interests of agencies including the Maritime and Coastguard Agency, police, Coroner, operator and manufacturer and incorporate these in investigation processes;

ILO 3.b   Identify the evidence sources that may be available to an investigation and personally demonstrate how to collect, preserve and interpret them;

ILO 4.b   Examine major accident investigation case studies and critically evaluate their relevance to investigation techniques and maritime safety;

ILO 5.b   Critically analyse evidence collected during an investigation, draw conclusions and make recommendations that do not lay blame, are replicable, logical and of sufficient scientific rigour;

ILO 6.b   Plan, organise and conduct an accident investigation, on site with due regard to personal safety, evidence preservation, ethics and rigour;

ILO 7.b   Appraise and use appropriate techniques for the analysis of evidence;

ILO 8.b   Work as part of an accident investigation team with an understanding of the various roles of other team members;

ILO 9.b   Compose an accident report in accordance with the structure laid out in national, or regional standards;

ILO 10.b   Plan and conduct effective presentations of their findings.

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C. Postgraduate Certificate in Safety and Accident Investigation (Rail Transport)

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

ILO 1.c   Demonstrate a fundamental understanding of, and the application thereof to current problems, the process of transport accident investigation including preparation, emergency response, evidence collection, analysis, report writing and making recommendations;

ILO 2.c   Understand the statutory obligations of an accident investigator and the competing interests of agencies including the police, Coroner, regulator, operator and manufacturer and incorporate these in investigation processes;

ILO 3.c   Identify the evidence sources that may be available to an investigation and personally demonstrate how to collect, preserve and interpret them;

ILO 4.c   Examine major accident investigation case studies and critically evaluate their relevance to investigation techniques and rail safety;

ILO 5.c   Critically analyse evidence collected during an investigation, draw conclusions and make recommendations that do not lay blame, are replicable, logical and of sufficient scientific rigour;

ILO 6.c   Plan, organise and conduct an accident investigation, on site with due regard to personal safety, evidence preservation, ethics and rigour;

ILO 7.c   Appraise and use appropriate techniques for the analysis of evidence;

ILO 8.c   Work as part of an accident investigation team with an understanding of the various roles of other team members;

ILO 9.c   Compose an accident report in accordance with the structure laid out in national, or regional standards;

ILO 10.c   Plan and conduct effective presentations of their findings.

D. Postgraduate Diploma in Safety and Accident Investigation (Air, Marine and Rail Transport)

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

ILO 11.   Demonstrate an advanced level of understanding, and application thereof to current problems, within a personal choice of technical areas to be chosen from, for example, but not restricted to, human factors, risk management, forensic science, crashworthiness and wreckage recovery;

ILO 12.   Develop personal expertise in the capability of being able to critically evaluate evidence collected within the personal choice of specialist technical areas so as to be able to conduct the investigation of an accident independently without supervision, or as part of a team;

ILO 13.   Develop personal management skills so as to be able to lead specialist teams in an area of the investigation in which they have achieved technical competence developed as a result of their academic studies.

F. MSc in Safety and Accident Investigation (Air, Marine and Rail Transport)

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

ILO 14.   Formulate a research task, develop aims and objectives for completing the research task, and setting research hypotheses where appropriate;

ILO 15.   Critically assess different methodologies and select an appropriate one to test a particular hypothesis;

ILO 16.   Collect primary and secondary data and know how to choose appropriate analysis techniques;

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ILO 17. Understand the potential biases that may influence researchers and methods to limit such occurrences;

ILO 18. Conduct a literature review and present it in an appropriate style;

ILO 19. Prepare a scientific thesis and present results based upon the techniques listed above;

ILO 20. Give a presentation to peers about the research project.

4. How is the course taught?

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

- Lectures from external speakers with expertise in particular aspects of the course;
- Access to library resources;
- Use of class and field exercises to help develop knowledge and techniques;
- Conducting an Individual Research Project (MSc only).

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:

PgCert in Safety and Accident Investigation (Air Transport)

Description	Credits
COMPULSORY MODULES:	
Modules: 1 and 2	60
ELECTIVE MODULES:	
n/a	
TOTAL:	60

PgCert in Safety and Accident Investigation (Marine Transport)

Description	Credits
COMPULSORY MODULES:	
Modules: 1 and 2	60
ELECTIVE MODULES:	
n/a	

TOTAL:	60

PgCert in Safety and Accident Investigation (Rail Transport)

Description	Credits
COMPULSORY MODULES:	
Modules: 1 and 2	60
ELECTIVE MODULES:	
n/a	
TOTAL:	60

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

PgDip in Safety and Accident Investigation (Air Transport)

Description	Credits
COMPULSORY MODULES:	
Modules: 1 and 2 PgDip Project: 18	60 20
ELECTIVE MODULES:	
Four modules selected from: 4-17	40
TOTAL:	120

PgDip in Safety and Accident Investigation (Marine Transport)

Description	Credits
COMPULSORY MODULES:	
Modules: 1 and 2 PgDip Project: 13	60 20
ELECTIVE MODULES:	
Four modules selected from: 4-12	40
TOTAL:	120

PgDip in Safety and Accident Investigation (Rail Transport)

Description	Credits
COMPULSORY MODULES:	
Modules: 1 and 2 PgDip Project: 15	60 20
ELECTIVE MODULES:	

Four modules selected from: 4-14	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:

MSc in Safety and Accident Investigation (Air Transport)

Description	Credits
COMPULSORY MODULES:	
Modules: 1, 2 and 3 Individual Research Project: 19	60 100
ELECTIVE MODULES:	
Four modules selected from: 4-17	40
TOTAL:	200

MSc in Safety and Accident Investigation (Marine Transport)

Description	Credits
COMPULSORY MODULES:	
Modules: 1, 2 and 3 Individual Research Project: 14	60 100
ELECTIVE MODULES:	
Four modules selected from: 4-12	40
TOTAL:	200

MSc in Safety and Accident Investigation (Rail Transport)

Description	Credits
COMPULSORY MODULES:	
Modules: 1, 2 and 3 Individual Research Project: 16	60 100
ELECTIVE MODULES:	
Four modules selected from: 4-14	40
TOTAL:	200

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

Pass Criteria

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

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

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee);[1][2]
- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
  - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
  - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **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 or May and are expected to complete the course within three years.

The basic structure of the programme is summarised below:

A. Postgraduate Certificate (PgCert)

PgCert in Safety and Accident Investigation (Air Transport)
Two compulsory/core modules to be taken in sequential order as follows:

- Fundamentals of Accident Investigation
- Applied Aircraft Accident Investigation

PgCert in Safety and Accident Investigation (Marine Transport)

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

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

Two compulsory/core modules to be taken in sequential order as follows:

- Fundamentals of Accident Investigation
- Applied Marine Accident Investigation

PgCert in Safety and Accident Investigation (Rail Transport)
Two compulsory/core modules to be taken in sequential order as follows:

- Fundamentals of Accident Investigation
- Applied Rail Accident Investigation

B. Postgraduate Diploma (PgDip)

PgDip in Safety and Accident Investigation (Air Transport)
As for the PgCert route, in addition, students select four modules from differing specialist areas including:

- Core Skills
- Management
- Engineering
- Operations
- Specialist Techniques

In addition to the four modules, PgDip students are required to complete a supervised research report on a subject of their choice within the field of aircraft accident investigation or an allied subject area.

PgDip in Safety and Accident Investigation (Marine Transport)
As for the PgCert route, in addition, students select four modules (worth 40 credits in total) from differing specialist areas including:

- Core Skills
- Management
- Engineering
- Operations
- Specialist Techniques

In addition to the four modules, PgDip students are required to complete a supervised research report on a subject of their choice within the field of marine accident investigation or an allied subject area.

PgDip in Safety and Accident Investigation (Rail Transport)
As for the PgCert route, in addition, students select four modules from differing specialist areas including:

- Core Skills
- Management
- Engineering
- Operations
- Specialist Techniques

In addition to the four modules, PgDip students are required to complete a supervised research report on a subject of their choice within the field of rail accident investigation or an allied subject area.

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C. MSc

MSc in Safety and Accident Investigation (Air Transport)
Similar to the PgDip route except that, instead of the research report, MSc students are required to complete a supervised Individual Research Project on a subject of their choice within the field of aircraft accident investigation or an allied subject area. The research is expected to go into much greater depth than that required for the PGDip.

MSc in Safety and Accident Investigation (Marine Transport)
Similar to the PgDip route except that, instead of the research report, MSc students are required to complete a supervised Individual Research Project on a subject of their choice within the field of marine accident investigation or an allied subject area. The research is expected to go into much greater depth than that required for the PgDip.

MSc in Safety and Accident Investigation (Rail Transport)
Similar to the PgDip route except that, instead of the research report, MSc students are required to complete a supervised Individual Research Project on a subject of their choice within the field of rail accident investigation or an allied subject area. The research is expected to go into much greater depth than that required for the PgDip.

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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.

MSc in Safety and Accident Investigation (Air Transport)

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers [4]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[5] - 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[6] (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	N-SAI-FOI	Fundamentals of Accident Investigation	Graham Wilson	100		30	Y	11/9/17 (Occ A17)	11/9/17 (Occ A17)	29/9/17 (Occ A17)	50 50 50	ICW (1) EX ICW (2)	20 30 50				18/9/17 27/9/17 27/11/17 (Occ A17)	At the next available opportunity which may not be until the course runs

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

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

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

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

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

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

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

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

Safety and Accident Investigation (Air – Marine – Rail) COURSE SPECIFICATION
QA&E USE ONLY: Version 4.2 September 2017   Course / SAS Version: 1.4

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
								15/1/18 (Occ B17)	15/1/18 (Occ B17)	2/2/18 (Occ B17)	50 50 50	ICW (1) EX ICW (2)	20 30 50				22/1/18 01/02/18 04/4/18 (Occ B17)	the following year
								14/5/18 (Occ C17)	14/5/18 (Occ C17)	1/6/18 (Occ C17)	50 50 50	ICW (1) EX ICW (2)	50 50 50				21/5/18 30/5/18 30/7/18 (Occ C17)	
2	N-SAI-AAIT	Applied Aircraft Accident Investigation	Alan Parmenter	100		30	N	5/2/18 (Occ A17)	5/2/18 (Occ A17)	23/2/18 (Occ A17)	50 50 50	ICW (1) GPROJ ICW (2)	35 35 30				12/2/18 19/2/18 23/4/18 (Occ A17)	At the next available opportunity which may not be until the course runs the following year
								4/6/18 (Occ B17)	4/6/18 (Occ B17)	22/6/18 (Occ B17)	50 50 50	ICW(1) GPROJ ICW (2)	35 35 30				11/5/18 18/5/18 20/8/18 (Occ B17)	
3	N-SAI-RM	Research Methods	Dr Jim Nixon	30		0	Y	6/11/17	6/11/17	10/11/17		AO	n/a				n/a	

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Type of Assessment	Weighting within module[6] (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
									Calendar			Independent Assessment		Multi-part Assessment			Submission dates	
4	N-AEN-ASC	Introduction to Aircraft Structural Crashworthiness	Dr Hessam Ghasemnejad	25		10	Y	02/07/18	02/07/18	06/07/18	40	ICW	100				03/09/18	At the next available opportunity which may not be until the course runs the following year
5	N-HFS-FDM	Flight Data Monitoring	Mr David Barry	25		10	Y	18/9/17 (Occ B17) 12/3/18 (Occ A17)	18/9/17 (Occ B17) 12/3/18 (Occ A17)	21/9/17 (Occ B17) 15/3/18 (Occ A17)	40	ICW	100				13/11/17 (Occ B17) 14/5/18 (Occ A17)	At the next available opportunity which may not be until the course runs the following year
6	N-SAI-ISMS	Aviation Safety Management	Dr Simon Mitchell/Mr David Barry	30		10	Y	4/9/17 (Occ A17) 16/4/18 (Occ B17)	4/9/17 (Occ A17) 16/4/18 (Occ B17)	8/9/17 (Occ A17) 20/4/18 (Occ B17)	40	ICW	100				6/11/17 (Occ A17) 25/6/18 (Occ B17)	At the next available opportunity which may not be until the course runs the following year
7	N-SAI-IHP	Investigating Human Performance	Peter McCarthy	30		10	Y	4/9/17 (Occ A17) 26/2/18 (Occ B17)	4/9/17 (Occ A17) 26/2/18 (Occ B17)	8/9/17 (Occ A17) 2/3/18 (Occ B17)	40	ICW	100				06/11/17 (Occ A17) 30/4/18 (Occ B17)	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

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												Type of Assessment	Weighting within module[6] (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
8	I-GIM-A1135	Aerial Photography and Digital Photogrammetry	Tim Brewer	50		10	Y	09/10/17	09/10/17	13/10/17	40	ICW	100				04/11/17	At the next available opportunity which may not be until the course runs the following year
9	R-FP-IEC	Investigation and Evidence Collection	Dr Karl Harrison	34		10	Y	09/10/17 (Occ A17)	09/10/17 (Occ A17)	13/10/17 (Occ A17)	50	ICW	100				08/12/17 (Occ A17)	At the next available opportunity which may not be until the course runs the following year
10	N-AW-SAAS	Safety Assessment of Aircraft Systems	Dr Simon Place	35		10	Y	13/11/17 (Occ A17) 25/6/18 (Occ B17)	13/11/17 (Occ A17) 25/6/18 (Occ B17)	17/11/17 (Occ A17) 29/6/18 (Occ B17)	40			100 MULTI	ICW GPRES	70 30	15/1/18 (Occ A17) 28/8/18 (Occ B17)	At the next available opportunity which may not be until the course runs the following year
11	N-SAI-LSAI	Legal Skills for Accident Investigators	Saryani Asmayawati	30		10	Y	19/3/18	19/3/18	23/3/18	40	ICW	100				21/5/18	At the next available opportunity which may not be until the course runs the

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

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																		following year
12	N-HFS-HFAM	Human Factors in Aviation Maintenance	C Turkoglu	30		10	Y	19/3/18	19/3/18	23/3/18	40 / 40	ICW / GPRES	90 / 10				ICW 21/5/18 GPRES 23/3/18	At the next available opportunity which may not be until the course runs the following year
13	R-FP-FEI	Fires, Explosions and their Investigation	Dr Mike Williams	28		10	Y	04/12/17 (Occ A17)	04/12/17 (Occ A17)	08/12/17 (Occ A17)	40	ICW	100				12/02/18 (Occ A16)	At the next available opportunity which may not be until the course runs the following year
14	R-FP-MFI	Mass Fatality Incidents	Dr Sophie Beckett	27		10	Y	05/03/2018	05/03/2018	09/03/2018	40	ICW	100				08/05/2018	At the next available opportunity which may not be until the course runs the following year

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Type of Assessment	Weighting within module[6] (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
												Independent Assessment		Multi-part Assessment			Submission dates	
15	N-AEX-CMBC	Crisis Management and Business Continuity	Mr David Barry	24		10	Y	30/10/17	30/10/17	3/11/17	40	ICW	100				05/01/18	At the next available opportunity which may not be until the course runs the following year
16	N-SAI-ITAI	Interviewing Techniques for Accident Investigators	Dr Graham Wilson	35		10	Y	5/3/18	5/3/18	9/3/18	40	ICW	100				08/5/18	At the next available opportunity which may not be until the course runs the following year
17	N-SAI-FMF	Fundamentals of Material Failures for Accident Investigators	Saryani Asmayawati	30		10	Y	23/10/17	23/10/17	27/10/17	40	ICW	100				02/01/18	At the next available opportunity which may not be until the course runs the following year
18	N-SAI-DITHES	PgDip Project	Saryani Asmayawati	20		20	Y	Various	Various	Various	50	ICW	100				4 weeks before end of	

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[5] – 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 module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
																	registration	
19	N-SAI-THES	Individual Research Project	Saryani Asmayawati	20		100	Y	1 yr duration	1 yr duration	End of 1 yr duration		THESIS OR	80 20				4 weeks before end of registration	

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

MSc in Safety and Accident Investigation (Marine Transport)

Module Number	Module code	Title	Module Leader	Contact hours[10]	Total hours delivered by Visiting Lecturers[11]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[12] - 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[13] (%) of Independent assessments	Weighting within module of multi-part assessments[14](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[15]	Assessment Submission and/or exam date[16]	Assessment / Exam Retake date
1	N-SAI-FOI	Fundamentals of Accident Investigation	Graham Wilson	100		30	Y	11/9/17 (Occ A17)	11/9/17 (Occ A17)	29/9/17 (Occ A17)	50 50 50	ICW (1) EX ICW (2)	20 30 50				18/9/17 27/9/17 27/11/17 (Occ A17)	At the next available opportunity which may not be until the course runs the following year
								15/1/18 (Occ B17)	15/1/18 (Occ B17)	2/2/18 (Occ B17)	50 50 50	ICW (1) EX ICW (2)	20 30 50				22/1/18 01/02/18 04/4/18	

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

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

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

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

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

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

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

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

Module Number	Module code	Title	Module Leader	Contact hours[10]	Total hours delivered by Visiting Lecturers[11]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[12] - 40% or 50%	Type of Assessment	Weighting within module[13] (%) of Independent assessments	Weighting within module of multi-part assessments[14] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[15]	Assessment Submission and/or exam date[16]	Assessment / Exam Retake date
								14/5/18 (Occ C17)	14/5/18 (Occ C17)	1/6/18 (Occ C17)	50 50 50	ICW (1) EX ICW (2)	50 50 50				(Occ B17) 21/5/18 30/5/18 30/7/18 (Occ C17)	
2	N-SAI-AMAI	Applied Marine Accident Investigation	Graham Wilson	100		30	N	2/10/17	2/10/17	20/10/17	50 50 50	ICW (1) GPROJ ICW (2)	35 35 30				9/10/17 18/10/17 18/12/17	At the next available opportunity which may not be until the course runs the following year
3	N-SAI-RM	Research Methods	Dr Jim Nixon	30		0	Y	6/11/17	6/11/17	10/11/17		AO	n/a				n/a	
4	N-SAI-LSAI	Legal Skills for Accident Investigators	Saryani Asmayawati	30		10	Y	19/3/18	19/3/18	23/3/18	40	ICW	100				21/5/18	At the next available opportunity which may not be until the course runs the following year
5	R-FP-IEC	Investigation and Evidence Collection	Dr Karl Harrison	34		10	Y	09/10/17 (Occ A17)	09/10/17 (Occ A17)	13/10/17 (Occ A17)	50	ICW	100				08/12/17 (Occ A17)	At the next available

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

Module Number	Module code	Title	Module Leader	Contact hours [10]	Total hours delivered by Visiting Lecturers [11]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark [12] - 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 [13] (%) of Independent assessments	Weighting within module of multi-part assessments [14] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment [15]	Assessment Submission and/or exam date [16]	Assessment / Exam Retake date
																		opportunity which may not be until the course runs the following year
6	R-FP-FEI	Fires, Explosions and their Investigations	Dr Mike Williams	28		10	Y	04/12/17 (Occ A17)	04/12/17 (Occ A17)	08/12/17 (Occ A17)	40	ICW	100				02/02/18 (Occ A17)	At the next available opportunity which may not be until the course runs the following year
7	N-SAI-FMF	Fundamentals of Material Failures for Accident Investigators	Saryani Asmayawati	30		10	Y	23/10/17	23/10/17	27/10/17	40	ICW	100				02/01/18	At the next available opportunity which may not be until the course runs the following year
8	R-FP-MFI	Mass Fatality Incidents	Dr Sophie Beckett	27		10	Y	05/03/18	05/03/18	09/03/18	40	ICW	100				08/05/18	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[10]	Total hours delivered by Visiting Lecturers[11]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[12] - 40% or 50%	Type of Assessment	Weighting within module[13] (%) of Independent assessments	Weighting within module of multi-part assessments[14] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[15]	Assessment Submission and/or exam date[16]	Assessment / Exam Retake date
									Calendar			**Assessment** — Independent Assessment		Multi-part Assessment			Submission dates	
9	N-AME-SI	Structural Integrity	Dr Ali Mehmanparast	38.5		10	Y	05/02/18	05/02/18	09/02/18	40	EX	100				exam week 4	At the next available opportunity which may not be until the course runs the following year
10	I-GIM-A1131	GIS Fundamentals	Tim Brewer	42		10	Y	23/10/17	23/10/17	27/10/17	40	ICW	100				18/11/17	At the next available opportunity which may not be until the course runs the following year
11	N-SAI-IHP	Investigating Human Performance	Peter McCarthy	30		10	Y	4/9/17 (Occ A17) 26/2/18 (Occ B17)	4/9/17 (Occ A17) 26/2/18 (Occ B17)	8/9/17 (Occ A17) 2/3/18 (Occ B17)	40	ICW	100				06/11/17 (Occ A17) 30/4/18 (Occ B17)	At the next available opportunity which may not be until the course runs the following year
12	N-SAI-ITAI	Interviewing Techniques for	Graham Wilson	35		10	Y	5/3/18	5/3/18	9/3/18	40	ICW	100				08/05/18	At the 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

Module Number	Module code	Title	Module Leader	Contact hours[10]	Total hours delivered by Visiting Lecturers[11]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[12] - 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[13] (%) of Independent assessments	Weighting within module of multi-part assessments[14] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[15]	Assessment Submission and/or exam date[16]	Assessment / Exam Retake date
		Accident Investigators																which may not be until the course runs the following year
13	N-SAI-DITHES	PgDip Project	Saryani Asmayawati	20		20	Y	Various	Various	Various	50	ICW	100				4 weeks before end of registration	
14	N-SAI-THES	Individual Research Project	Saryani Asmayawati	20		100	Y	1 yr duration	1 yr duration	End of 1 yr duration		THESIS OR	80 20				4 weeks before end of registration	

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

MSc in Safety and Accident Investigation (Rail Transport)

| Module Number | Module code | Title | Module Leader | Contact hours[17] | Total hours delivered by Visiting Lecturers[18] | Credits | Is the module shared? Y/N | Calendar | | | Minimum Mark[19] - 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[20] (%) of Independent assessments	Weighting within module of multi-part assessments[21] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[22]	Assessment Submission and/or exam date[23]	Assessment / Exam Retake date
1	N-SAI-FOI	Fundamentals of Accident Investigation	Graham Wilson	100		30	Y	11/9/17 (Occ A17)	11/9/17 (Occ A17)	29/9/17 (Occ A17)	50 50 50	ICW (1) EX ICW (2)	20 30 50				18/9/17 27/9/17 27/11/17 (Occ A17)	At the next available opportunity which may not be until the course runs the following year
								15/1/18 (Occ B17)	15/1/18 (Occ B17)	2/2/18 (Occ B17)	50 50 50	ICW (1) EX ICW (2)	20 30 50				22/1/18 01/02/18 04/4/18	

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

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

[19] 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.

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

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

[22] 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.

[23] 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[17]	Total hours delivered by Visiting Lecturers[18]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[19] - 40% or 50%	Type of Assessment	Weighting within module[20] (%) of Independent assessments	Weighting within module of multi-part assessments[21] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[22]	Assessment Submission and/or exam date[23]	Assessment / Exam Retake date
								14/5/18 (Occ C17)	14/5/18 (Occ C17)	1/6/18 (Occ C17)	50 50 50	ICW (1) EX ICW (2)	50 50 50				(Occ B17) 21/5/18 30/5/18 30/7/18 (Occ C17)	
2	N-SAI-ARAI	Applied Rail Accident Investigation	Saryani Asmayawati	100		30	N	2/7/18	2/7/18	2/7/18	50 50 50	ICW (1) GPROJ ICW (2)	35 35 30				16/7/18 20/07/18 17/09/18	At the next available opportunity which may not be until the course runs the following year
3	N-SAI-RM	Research Methods	Dr Jim Nixon	30		0	Y	2/7/17	2/7/17	10/11/17		AO	n/a				n/a	
4	I-GIM-A1135	Aerial Photography and Digital Photogrammetry	Tim Brewer	50		10	Y	09/10/17	09/10/17	13/10/17	40	ICW	100				04/11/17	At the next available opportunity which may not be until the course runs the following year

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

Safety and Accident Investigation (Air – Marine – Rail) COURSE SPECIFICATION
QA&E USE ONLY: Version 4.2 September 2017   Course / SAS Version: 1.4

Module Number	Module code	Title	Module Leader	Contact hours[17]	Total hours delivered by Visiting Lecturers[18]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[19] - 40% or 50%	Type of Assessment	Weighting within module[20] (%) of Independent assessments	Weighting within module of multi-part assessments[21] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[22]	Assessment Submission and/or exam date[23]	Assessment / Exam Retake date
									Calendar			Independent Assessment		Multi-part Assessment			Submission dates	
5	R-FP-IEC	Investigation and Evidence Collection	Dr Karl Harrison	34		10	Y	09/10/17 (Occ A17)	09/10/17 (Occ A17)	13/10/17 (Occ A17)	50	ICW	100				08/12/17 (Occ A17)	At the next available opportunity which may not be until the course runs the following year
6	R-FP-FEI	Fires, Explosions and their Investigation	Dr Mike Williams	28		10	Y	04/12/17 (Occ A17)	04/12/17 (Occ A17)	08/12/17 (Occ A17)	40	ICW	100				12/02/18 (Occ A17)	At the next available opportunity which may not be until the course runs the following year
7	N-SAI-FMF	Fundamentals of Material Failures for Accident Investigators	Saryani Asmayawati	30		10	Y	23/10/17	23/10/17	27/10/17	40	ICW	100				02/01/18	At the next available opportunity which may not be until the course runs the following year
8	R-FP-MFI	Mass Fatality Incidents	Dr Sophie Beckett	27		10	Y	05/03/18	05/03/18	09/03/18	40	ICW	100				08/05/18	At the next available opportunity which may not be until the course runs

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[17]	Total hours delivered by Visiting Lecturers [18]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[19] - 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[20] (%) of Independent assessments	Weighting within module of multi-part assessments [21](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[22]	Assessment Submission and/or exam date[23]	Assessment / Exam Retake date
																		the following year
9	N-AME-SI	Structural Integrity	Dr Ali Mehmanparast	38.5		10	Y	05/02/18	05/02/18	09/02/18	40	EX	100				exam week 4	At the next available opportunity which may not be until the course runs the following year
10	N-SAI-LSAI	Legal Skills for Accident Investigators	Saryani Asmayawati	30		10	Y	19/3/18	19/3/18	23/3/18	40	ICW	100				21/5/18	At the next available opportunity which may not be until the course runs the following year
11	N-SAI-IHP	Investigating Human Performance	Peter McCarthy	30		10	Y	4/9/17 (Occ A17) 26/2/18 (Occ B17)	4/9/17 (Occ A17) 26/2/18 (Occ B17)	8/9/17 (Occ A17) 2/3/18 (Occ B17)	40	ICW	100				06/11/17 (Occ A15) 130/4/18 (Occ B17)	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[17]	Total hours delivered by Visiting Lecturers[18]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[19] - 40% or 50%	Type of Assessment	Weighting within module[20] (%) of Independent assessments	Weighting within module of multi-part assessments[21] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[22]	Assessment Submission and/or exam date[23]	Assessment / Exam Retake date
												Independent Assessment		Multi-part Assessment			Submission dates	
12	N-SAI-ITAI	Interviewing Techniques for Accident Investigators	Graham Wilson	35		10	Y	5/3/18	5/3/18	9/3/18	40	ICW	100				08/05/18	At the next available opportunity which may not be until the course runs the following year
13	N-SAI-TRS	Traction and Rolling Stock	Saryani Asmayawati	30		10	N	**NOT RUNNING IN 2017/18**			40	ICW	100					
14	N-SAI-IRST	Introduction to Railway Signalling Technologies	Saryani Asmayawati	30		10	N	**NOT RUNNING IN 2017/18**			40	ICW	100					
15	N-SAI-DITHES	PgDip Project	Saryani Asmayawati	20		20	Y	Various	Various	Various	50	ICW	100				4 weeks before end of registration	
16	N-SAI-THES	Individual Research Project	Saryani Asmayawati	20		100	Y	1 yr duration	1 yr duration	End of 1 yr duration		THESIS OR	80 20				4 weeks before end of registration	

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.

MSc in Safety and Accident Investigation (Air Transport)

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
N-SAI-FOI	Fundamentals of Accident Investigation	Safety and Accident Investigation (Air Transport)	Safety and Accident Investigation (Marine Transport) Safety and Accident Investigation (Rail Transport)
N-HFS-RMS (assessed) N-SAI-RM (non-assessed)	Research Methods	Safety and Human Factors in Aviation	Safety and Accident Investigation (Marine Transport) Safety and Accident Investigation (Rail Transport)
N-AEN-ASC	Introduction to Aircraft Structural Crashworthiness	Aircraft Engineering	Airworthiness Military Aerospace and Airworthiness
N-HFS-FDM	Flight Data Monitoring	Safety and Human Factors in Aviation	Safety and Accident Investigation (Air Transport)
N-SAI-ISMS	Aviation Safety Management	Safety and Accident Investigation (Air Transport)	Airworthiness Military Aerospace and Airworthiness Air Transport Management (Executive) Air Transport Management (Full Time) Safety and Human Factors in Aviation
N-SAI-IHP	Investigating Human Performance	Safety and Accident Investigation (Air Transport)	Safety Accident and Investigation (Marine Transport) Safety Accident and Investigation (Rail Transport)
I-GIM-A1135	Aerial Photography and Digital Photogrammetry	Geographical Information Management	Land Reclamation and Restoration Safety and Accident

			Investigation (Rail Transport)
R-FP-IEC	Investigation and Evidence Collection	Forensic Programme	Safety and Accident Investigation (Marine Transport) Safety and Accident Investigation (Rail Transport)
N-AW-SAAS	Safety Assessment of Aircraft Systems	Airworthiness	Military Aerospace and Airworthiness Safety and Human Factors in Aviation
N-SAI-LSAI	Legal Skills for Accident Investigators	Safety and Accident Investigation (Air Transport)	Safety Accident and Investigation (Marine Transport) Safety Accident and Investigation (Rail Transport)
N-HFS-HFAM	Human Factors in Aviation Maintenance	Safety and Human Factors in Aviation	Airworthiness Military Aerospace and Airworthiness
R-FP-FEI	Fires, Explosions and their Investigation	Forensic Programme	Safety and Accident Investigation (Marine Transport) Safety and Accident Investigation (Rail Transport)
R-FP-MFI	Mass Fatality Incidents	Forensic Programme	Safety and Accident Investigation (Marine Transport) Safety and Accident Investigation (Rail Transport)
N-AEX-CMBC	Crisis Management and Business Continuity	Executive Air Transport Management	
N-SAI-ITAI	Interviewing Techniques for Accident Investigators	Safety and Accident Investigation (Air Transport)	Safety and Accident Investigation (Marine Transport) Safety and Accident Investigation (Rail Transport)
N-SAI-FMF	Fundamentals of Material Failures for Accident Investigators	Safety and Accident Investigation (Air Transport)	Safety and Accident Investigation (Marine Transport) Safety and Accident Investigation (Rail Transport)

Module code	Module title	Course that owns the module	Course(s)/programme(s) that share the module
N-SAI-DITHES	PgDip Project	Safety and Accident Investigation (Air Transport)	Safety and Accident Investigation (Marine Transport)
			Safety and Accident Investigation (Rail Transport)
N-SAI-THES	Individual Research Project	Safety and Accident Investigation (Air Transport)	Safety and Accident Investigation (Marine Transport)
			Safety and Accident Investigation (Rail Transport)

MSc in Safety and Accident Investigation (Marine Transport)

Module code	Module title	Course that owns the module	Course(s)/programme(s) that share the module
N-SAI-FOI	Fundamentals of Accident Investigation	Safety and Accident Investigation (Air Transport)	Safety and Accident Investigation (Rail Transport)
N-HFS-RMS (assessed) N-SAI-RM (non-assessed)	Research Methods	Safety and Human Factors in Aviation	Safety and Accident Investigation (Air Transport)
			Safety and Accident Investigation (Rail Transport)
N-SAI-LSAI	Legal Skills for Accident Investigators	Safety and Accident Investigation (Air Transport)	Safety and Accident Investigation (Rail Transport)
R-FP-IEC	Investigation and Evidence Collection	Forensic Programme	Safety and Accident Investigation (Air Transport)
			Safety and Accident Investigation (Rail Transport)
R-FP-FEI	Fires, Explosions and their Investigation	Forensic Programme	Safety and Accident Investigation (Air Transport)
			Safety and Accident Investigation (Rail Transport)
N-SAI-FMF	Fundamentals of Material Failures for Accident Investigators	Safety and Accident Investigation (Air Transport)	Safety and Accident Investigation (Rail Transport)
R-FP-MFI	Mass Fatality Incidents	Forensic Programme	Safety and Accident Investigation (Air Transport)
			Safety and Accident

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			Investigation (Rail Transport)
N-AME-SI	Structural Integrity	Advanced Mechanical Engineering	Design of Rotating Machines 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 Renewable Energy Offshore and Ocean Technology with Risk Management Offshore and Ocean Technology with Subsea Engineering Renewable Energy Engineering Renewable Energy Marine Structures EngD Safety and Accident Investigation (Rail Transport)
I-GIM-A1131	GIS Fundamentals	Geographical Information Management	Land Reclamation and Restoration Renewable Energy Marine Structures EngD
N-SAI-IHP	Investigating Human Performance	Safety and Accident Investigation (Air Transport)	Safety Accident and Investigation (Rail Transport)
N-SAI-ITAI	Interviewing Techniques for Accident Investigators	Safety and Accident Investigation (Air Transport)	Safety and Accident Investigation (Rail Transport)
N-SAI-DITHES	PgDip Project	Safety and Accident Investigation (Air Transport)	Safety and Accident Investigation (Rail Transport)

Module code	Module title	Course that owns the module	Course(s)/programme(s) that share the module
N-SAI-THES	Individual Research Project	Safety and Accident Investigation (Air Transport)	Safety and Accident Investigation (Rail Transport)

MSc in Safety and Accident Investigation (Rail Transport)

Module code	Module title	Course that owns the module	Course(s)/programme(s) that share the module
N-SAI-FOI	Fundamentals of Accident Investigation	Safety and Accident Investigation (Air Transport)	Safety and Accident Investigation (Marine Transport)
N-HFS-RMS (assessed) N-SAI-RM (non-assessed)	Research Methods	Safety and Human Factors in Aviation	Safety and Accident Investigation (Air Transport) Safety and Accident Investigation (Marine Transport)
I-GIM-A1135	Aerial Photography and Digital Photogrammetry	Geographical Information Management	Land Reclamation and Restoration Safety and Accident Investigation (Air Transport)
R-FP-IEC	Investigation and Evidence Collection	Forensic Programme	Safety and Accident Investigation (Air Transport) Safety and Accident Investigation (Marine Transport)
R-FP-FEI	Fires, Explosions and their Investigation	Forensic Programme	Safety and Accident Investigation (Air Transport) Safety and Accident Investigation (Marine Transport)
N-SAI-FMF	Fundamentals of Material Failures for Accident Investigators	Safety and Accident Investigation (Air Transport)	Safety and Accident Investigation (Marine Transport)
R-FP-MFI	Mass Fatality Incidents	Forensic Programme	Safety and Accident Investigation (Air Transport) Safety and Accident Investigation (Marine Transport)
N-AME-SI	Structural Integrity	Advanced Mechanical	Design of Rotating Machines

			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 Renewable Energy
			Offshore and Ocean Technology with Risk Management
			Offshore and Ocean Technology with Subsea Engineering
			Renewable Energy Engineering
			Renewable Energy Marine Structures EngD
			Safety and Accident Investigation (Marine Transport)
N-SAI-LSAI	Legal Skills for Accident Investigators	Safety and Accident Investigation (Air Transport)	Safety and Accident Investigation (Marine Transport)
N-SAI-IHP	Investigating Human Performance	Safety and Accident Investigation (Air Transport)	Safety Accident and Investigation (Marine Transport)
N-SAI-ITAI	Interviewing Techniques for Accident Investigators	Safety and Accident Investigation (Air Transport)	Safety and Accident Investigation (Marine Transport)
N-SAI-DITHES	PgDip Project	Safety and Accident Investigation (Air Transport)	Safety and Accident Investigation (Marine Transport)
N-SAI-THES	Individual Research Project	Safety and Accident Investigation (Air Transport)	Safety and Accident Investigation (Marine Transport)

7. How are the ILOs assessed?

The following assessment types are utilised:

Safety and Accident Investigation (Air Transport)
The course uses a range of assessment types. Overall, the MSc in Safety and Accident Investigation (Air Transport) has **two** distinct but interrelated elements: the taught modules, and the Individual Research Project. All modules are assessed by a variable combination of written assignments and/or examination, and, in the case of the Individual Research Project, by assessment of the written work and an oral presentation on their research findings.

The two compulsory modules, Fundamentals of Accident Investigation and Applied Aircraft Accident Investigation, include the following types of assessments:

- Group exercises
- Individual written reports (reflection notes)
- Course test
- Major field exercise
- Accident investigation report
- Essays

Where applicable, module assignments are set to be challenging and to encourage the student to study the module topic areas in more depth. The objectives of the assignments are for the students to:

- Acquire the skill to efficiently search literature
- Acquire an in-depth knowledge of safety and accident investigation issues
- Apply skills and knowledge to assess specific techniques
- Develop the power to critically analyse data
- Compile succinct and informative reports to a high standard
- Formulate responses to specific questions against a time limit

This approach has been adopted in order to facilitate the completion of the course by part-time students, often from abroad, without the need to return for examinations. However, some modules are examined and this may influence the selection of modules by students.

For those continuing to MSc level, a formal Individual Research Project has to be presented at the end of the registration period and must demonstrate competency in hypothesis formation, literature review, methodology, analysis, conclusion forming and presentation. Students will also be asked to give a formal oral presentation on their research findings.

Safety and Accident Investigation (Marine Transport)
The course uses a range of assessment types. Overall, the MSc in Safety and Accident Investigation (Marine Transport) has **two** distinct but interrelated elements: the taught modules, and the Individual Research Project. All modules are assessed by a variable combination of written assignments and/or examination, and, in the case of the Individual Research Project, by assessment of the written work and an oral presentation on their research findings.

The two compulsory modules, Fundamentals of Accident Investigation and Applied Marine Accident Investigation, include the following types of assessments:

- Group exercises
- Individual written reports (reflection notes)
- Course test

- Major field exercise
- Accident investigation report
- Essays

Where applicable, module assignments are set to be challenging and to encourage the student to study the module topic areas in more depth. The objectives of the assignments are for the students to:

- Acquire the skill to efficiently search literature
- Acquire an in-depth knowledge of safety and accident investigation issues
- Apply skills and knowledge to assess specific techniques
- Develop the power to critically analyse data
- Compile succinct and informative reports to a high standard
- Formulate responses to specific questions against a time limit

This approach has been adopted in order to facilitate the completion of the course by part-time students, often from abroad, without the need to return for examinations. However, some modules are examined and this may influence the selection of modules by students.

For those continuing to MSc level, a formal Individual Research Project has to be presented at the end of the registration period and must demonstrate competency in hypothesis formation, literature review, methodology, analysis, conclusion forming and presentation. Students will also be asked to give a formal oral presentation on their research findings.

Safety and Accident Investigation (Rail Transport)
The course uses a range of assessment types. Overall, the MSc in Safety and Accident Investigation (Rail Transport) has **two** distinct but interrelated elements: the taught modules, and the Individual Research Project. All modules are assessed by a variable combination of written assignments and/or examination, and, in the case of the Individual Research Project, by assessment of the written work and an oral presentation on their research findings.

The two compulsory modules, Fundamentals of Accident Investigation and Applied Rail Accident Investigation, include the following types of assessments:

- Group exercises
- Individual written reports (reflection notes)
- Course test
- Major field exercise
- Accident investigation report
- Essays

Where applicable, module assignments are set to be challenging and to encourage the student to study the module topic areas in more depth. The objectives of the assignments are for the students to:

- Acquire the skill to efficiently search literature
- Acquire an in-depth knowledge of safety and accident investigation issues
- Apply skills and knowledge to assess specific techniques
- Develop the power to critically analyse data
- Compile succinct and informative reports to a high standard
- Formulate responses to specific questions against a time limit

This approach has been adopted in order to facilitate the completion of the course by part-time students, often from abroad, without the need to return for examinations. However, some modules are examined and this may influence the selection of modules by students.

For those continuing to MSc level, a formal Individual Research Project has to be presented at the end of the registration period and must demonstrate competency in hypothesis formation, literature review, methodology, analysis, conclusion forming and presentation. Students will also be asked to give a formal oral presentation on their research findings.

Assessment and ILO Mapping

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

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

A. Postgraduate Certificate in Safety and Accident Investigation (Air Transport)

Award ILOs / Module No.	ILO 1.a	ILO 2.a	ILO 3.a	ILO 4.a	ILO 5.a	ILO 6.a	ILO 7.a	ILO 8.a	ILO 9.a	ILO 10.a
1	ICW (1)	ICW (2)	EX							
2	ICW (2)		GPROJ	ICW (1)	GPROJ	GPROJ	GPROJ	GPROJ	GPROJ	GPROJ

B. Postgraduate Certificate in Safety and Accident Investigation (Marine Transport)

Award ILOs / Module No.	ILO 1.b	ILO 2.b	ILO 3.b	ILO 4.b	ILO 5.b	ILO 6.b	ILO 7.b	ILO 8.b	ILO 9.b	ILO 10.b
1	ICW (1)	ICW (2)	EX							
2	ICW (2)		GPROJ	ICW (1)	GPROJ	GPROJ	GPROJ	GPROJ	GPROJ	GPROJ

C. Postgraduate Certificate in Safety and Accident Investigation (Rail Transport)

Award ILOs / Module No.	ILO 1.c	ILO 2.c	ILO 3.c	ILO 4.c	ILO 5.c	ILO 6.c	ILO 7.c	ILO 8.c	ILO 9.c	ILO 10.c
1	ICW (1)	ICW (2)	EX							
2	ICW (2)		GPROJ	ICW (1)	GPROJ	GPROJ	GPROJ	GPROJ	GPROJ	GPROJ

D. Postgraduate Diploma in Safety and Accident Investigation (Air Transport)

In addition to those outlined for the Postgraduate Certificate in Safety and Accident Investigation (Air Transport), the Award intended learning outcomes are assessed by the following module assessments:

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Award ILOs Module No.	ILO 11	ILO 12	ILO 13
4	ICW	ICW	ICW
5	ICW	ICW	ICW
6	ICW	ICW	ICW
7	ICW	ICW	ICW
8	ICW	ICW	ICW
9	ICW	ICW	ICW
10	ICW	ICW	ICW
11	ICW	ICW	ICW
12	ICW	GPRES	GPRES
13	ICW	ICW	ICW
14	ICW	ICW	ICW
15	ICW	ICW	ICW
16	ICW	ICW	IPRES
17	ICW	ICW	ICW
18	ICW	ICW	ICW

E. Postgraduate Diploma in Safety and Accident Investigation (Marine Transport)

In addition to those outlined for the Postgraduate Certificate in Safety and Accident Investigation (Marine Transport), the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs Module No.	ILO 11	ILO 12	ILO 13
4	ICW	ICW	ICW
5	ICW	ICW	ICW
6	ICW	ICW	ICW
7	ICW	ICW	ICW
8	ICW	ICW	ICW
9	EX	EX	EX
10	ICW	ICW	ICW
11	ICW	ICW	ICW
12	ICW	ICW	IPRES
13	ICW	ICW	ICW

F. Postgraduate Diploma in Safety and Accident Investigation (Rail Transport)

In addition to those outlined for the Postgraduate Certificate in Safety and Accident Investigation (Rail Transport), the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 11	ILO 12	ILO 13
4	ICW	ICW	ICW
5	ICW	ICW	ICW
6	ICW	ICW	ICW
7	ICW	ICW	ICW
8	ICW	ICW	ICW
9	EX	EX	EX
10	ICW	ICW	ICW
11	ICW	ICW	ICW
12	ICW	ICW	IPRES
13	ICW	ICW	ICW
14	ICW	ICW	ICW
15	ICW	ICW	ICW

G. MSc in Safety and Accident Investigation (Air Transport)

In addition to those outlined above for the Postgraduate Diploma in Safety and Accident Investigation (Air Transport), the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 14	ILO 15	ILO 16	ILO 17	ILO 18	ILO 19	ILO 20
19	THESIS	THESIS	THESIS	THESIS	THESIS	THESIS	OR

H. MSc in Safety and Accident Investigation (Marine Transport)

In addition to those outlined above for the Postgraduate Diploma in Safety and Accident Investigation (Marine Transport), the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 14	ILO 15	ILO 16	ILO 17	ILO 18	ILO 19	ILO 20
14	THESIS	THESIS	THESIS	THESIS	THESIS	THESIS	OR

I. MSc in Safety and Accident Investigation (Rail Transport)

In addition to those outlined above for the Postgraduate Diploma in Safety and Accident Investigation (Rail Transport), the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 14	ILO 15	ILO 16	ILO 17	ILO 18	ILO 19	ILO 20
16	THESIS	THESIS	THESIS	THESIS	THESIS	THESIS	OR

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

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

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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?**

All students are part-time, and are usually in full-time employment. However the MSc prepares them for a higher level of responsibility in the transport safety and accident investigation field, and allied careers. Feedback from past students (the course was launched in 2005) shows that employers regard Cranfield's provision in this area as being world-leading.

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 Safety and Human Factors in Aviation

Date of first publication/latest revision:	September 2016

1. What is the course?

Course information

Course Title	MSc in Safety and Human Factors in Aviation
Course code	MSSHAFTC, MSSHAPTC, PCSHAPTC
Academic Year	2017/18
Valid entry routes	MSc, PgCert
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time (MSc), Part-time (MSc, PgCert)
Location(s)[1] of Study	Cranfield University
School(s)	School of Aerospace, Transport and Manufacturing
Theme	Transport Systems
Centre	Centre for Safety and Accident Investigation
Course Director	Dr Jim Nixon
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)	Not Applicable
Registration Period(s)	Full-time MSc - one year, Part-time MSc - up to three years,

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[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

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available	Part-time PgCert - two years
Course Start Month(s)	October

Institutions delivering the course

This course is delivered by the School of Aerospace, Transport and Manufacturing, Transport Systems Theme, Centre for Safety and Accident Investigation where the research interests include:

- Aeronautics
- Safety
- Human Factors
- Psychology

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 currently accredited by any external bodies.

2. What are the aims of the course?

Cranfield University offers this course in order to:

- Provide an understanding of the importance of human factors in safety and performance improvement in aviation.
- Provide students, engineers, scientists and professionals from industry, with an understanding of the factors contributing to human error and accidents and the skills to propose and evaluate safety improvements.

This programme is intended for the following range of students:

- Engineering
- Aeronautical
- Psychology and Social Sciences

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

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

A. **Postgraduate Certificate**

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

ILO 1.   Demonstrate a systematic understanding of the elements that contribute to aviation safety including software, hardware, liveware and environment and the interfaces between them;

ILO 2.   Identify, evaluate and apply appropriate contemporary techniques for the evaluation of human-machine interfaces, human performance, safety performance and risk;

ILO 3.   Design interventions to manage threats and errors in aviation within the constraints of international standards and recommended practices;

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ILO 4. Work both independently and as a member of a team towards the solution of complex safety and human factors related problems;

ILO 5. Use transferable skills developed through teamwork, communication and problem-solving to enhance their careers in human factors and safety management.

B. MSc

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

ILO 6. Apply the techniques developed above into areas of specialism including; aviation maintenance, flight deck design, training and simulation, accident investigation, occupational health and safety management.

ILO 7. Undertake an independent research project based on literature review; evaluation and selection of a suitable research methodology; collection and analysis of data to produce defensible findings.

4. How is the course taught?

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

- Lectures
- Practical exercises
- Private study
- Group work

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 modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Module 1: Course Introduction Modules: 3, 4 and 7	0 30 (10 credits each)
ELECTIVE MODULES:	
Any three other credit bearing modules chosen from course modules: 2, 5, 6, 8, 9, 12, 13, 14, 15 and 16 (NB: Module 15 is only available as an elective module to cohorts registered prior to 2016/17)	30 (10 credits each)

TOTAL:	60

B.   Postgraduate Diploma

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

Description	Credits
COMPULSORY MODULES:	
Module 1: Course Introduction Modules: 2-11	0 100 (10 credits each)
ELECTIVE MODULES:	
Modules selected from: 12-15 and 16, to the value of 20 credits (Note: Module 15 is only available as an elective module to cohorts registered prior to 2016/17)	20 (10 credits each)
TOTAL:	120

C.   MSc

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

Description	Credits
COMPULSORY MODULES:	
Module 1: Course Introduction Modules: 2-11 Individual Research Project: 17	0 100 (10 credits each) 80
ELECTIVE MODULES:	
Modules selected from: 12-15 and 16, to the value of 20 credits (Note: Module 15 is only available as an elective module to cohorts registered prior to 2016/17)	20 (10 credits each)
TOTAL:	200

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

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

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

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;

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- 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 twelve calendar months.

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

The MSc course consists of studying 8 compulsory modules, 2 optional modules, 2 group project modules and submission of an individual research project. In addition, all students will complete the zero-credit induction module which will include the fundamentals of aeronautics, IT and library skills training to achieve MSc.

The PG Certificate consists of studying three compulsory modules and then three other modules selected by the student from the remaining modules specified as part of the MSc course excluding the Capstone project.

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[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	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 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
1	N-HFS-IND	Safety and Human Factors in Aviation Course Induction	Dr Jim Nixon	15	0	0	N	02/10/17	02/10/17	06/10/17	N/A	AO	N/A				N/A	N/A
2	N-HFS-IHF	Cognitive Ergonomics	Dr Jim Nixon	30	0	10	N	09/10/17	09/10/17	13/10/17	40	ICW	100				13/11/17 FT 14/12/17PT	At the next available opportunity which may not be until

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[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 (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
																		the course runs the following year
3	N-AW-SAAS (Occ C)	Safety Assessment of Aircraft Systems	Dr Simon Place	35	15	10	Y	15/01/18	15/01/18	19/01/18	50			100 MULTI	GPRES ICW	30 70	19/02/18 FT 19/03/18 PT	At the next available opportunity which may not be until the course runs the following year
4	N-HFS-HPE	Human Performance and Error	Dr Hamad Rashid	30	10	10	N	23/10/17	23/10/17	27/10/17	40	ICW	100				04/12/17 FT 02/01/18 PT	At the next available opportunity which may not be until the course runs the following year
5	N-HFS-FDD	Human-Computer Interaction in Aviation	Dr Wen-Chin Li	30	10	10	N	04/12/17	04/12/17	08/12/17	40	EX	100				Week 3	At the next available opportunity which may not be until the course runs the following year
6	N-HFS-RMS	Research Methods	Dr Jim Nixon	30	0	10	Y	06/11/17	06/11/17	10/11/17	40	ICW	100				11/12/17 FT 08/01/18 PT	At the next available which

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 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
																		may not be until the course runs the following year
7	N-SAI-ISMS Occ C	Aviation Safety Management	Dr Simon Mitchell\n\nDavid Barry	30	10	10	Y	12/02/18	12/02/18	16/02/18	50	ICW	100				19/03/18 FT 16/04/18 PT	At the next available opportunity which may not be until the course runs the following year
8	N-HFS-OH	Aviation Medicine	Dr Matthew Greaves\n\nProf Michael Bagshaw	30	30	10	N	20/11/17	20/11/17	24/11/17	40	EX	100				Week 3	At the next available opportunity which may not be until the course runs the following year
9	N-HFS-AAI	Aircraft Accident Investigation and Response	Peter McCarthy	30	10	10	Y	09/04/18	09/04/18	13/04/18	40	ICW	100				14/04/18FT 11/06/18 PT	At the next available opportunity which may not be until the course runs the following year
10	N-HFS-ASA	Applied Safety Assessment	Dr Simon Place	35	35	10	N	29/01/18	29/01/18	02/02/18	40			100 MULTI	GCW ICW	50 50	02/02/17 05/03/18 FT	At the next available opportunity which

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 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
																	03/04/18 PT	may not be until the course runs the following year
11	N-HFS-SHFCP	Safety and Human Factors 'Capstone' Project	Peter McCarthy	10	0	10	N	23/04/18	23/04/18	27/04/18	40 40 40	GCW ICW GPRES	50 25 25				29/05/18 FT 25/06/18 PT	At the next available opportunity which may not be until the course runs the following year
12	N-HFS-TS	Training and Simulation	Dr Wen-Chin Li	30	2	10	N	26/02/18	26/02/18	02/03/18	40	ICW	100				30/03/18 FT 30/04/18 PT	At the next available opportunity which may not be until the course runs the following year
13	N-HFS-HFAM	Human Factors in Aviation Maintenance	Dr Hamad Rashid	30	10	10	Y	19/03/18	19/03/18	23/03/18	40 40	ICW GPRES	90 10				23/04/18 FT 21/05/18 PT 19/03/18	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	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
14	N-HFS-FDM Occ A	Flight Data Monitoring	David Barry	25	22	10	Y	12/03/18	12/03/18	15/03/18	40	ICW	100				16/04/18 FT 14/05/18 PT	At the next available opportunity which may not be until the course runs the following year
15	N-AW-ATEMO	Air Transport Engineering – Maintenance Operations MODULE ONLY AVAILABLE TO COHORTS REGISTERED PRIOR TO 2016/17 INTAKE	Dr Cergiz Turkoglu	30	0	10	Y	12/02/18	12/02/18	16/02/18	40			100 MULTI	EX ICW	30 70	EX 16/02/18 26/03/18 FT 16/04/18 PT	At the next available opportunity which may not be until the course runs the following year
16	N-HFS-WJD	Work and Job Design*	Dr Rebecca Charles	30		10	N	05/03/18	05/03/18	09/03/18	40	ICW	100				09/04/18 FT 08/05/18 PT	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%	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
17	N-HFS-THESIS	Individual Research Project (MSc)	Dr Hamad Rashid	20	0	80	N	02/10/17	02/10/17	06/08/18		THESIS OR	90 10				THESIS 13/08/18	

Elective module will only run if available. Please contact your SAS Lead for further information.

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-AW-SAAS	Safety Assessment of Aircraft Systems	Airworthiness	Military Aerospace and Airworthiness Safety and Accident Investigation (Air Transport)
N-SAI-ISMS	Aviation Safety Management	Safety and Accident Investigation (Air Transport)	Airworthiness Air Transport Management (Executive) F-T Air Transport Management Military Aerospace and Airworthiness
N-HFS-AAI	Aircraft Accident Investigation and Response	Safety and Human Factors in Aviation	Airworthiness Military Aerospace and Airworthiness Forensic Engineering and Science
N-HFS-HFAM	Human Factors in Aviation Maintenance	Safety and Human Factors in Aviation	Airworthiness Military Aerospace and Airworthiness Safety and Accident Investigation (Air Transport)
N-HFS-FDM	Flight Data Monitoring	Safety and Human Factors in Aviation	Safety and Accident Investigation (Air Transport)
N-AW-ATEMO	Air Transport Engineering – Maintenance Operations	Airworthiness	F-T Air Transport Management Executive Air Transport Management Military Aerospace and Airworthiness
N-HFS-RMS (assessed)	Research Methods	Safety and Human Factors in	Safety and Accident Investigation (Air Transport)

| N-SAI-RM (non-assessed) | | Aviation | Safety and Accident Investigation (Marine Transport) |
| | | | Safety and Accident Investigation (Rail Transport) |

7. **How are the ILOs assessed?**

The following assessment types are used Group work, Group Presentations, Individual coursework and Examinations.

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

Students are subject to two forms of assessment with regard to the group project. Firstly, they must submit group coursework and secondly, their group project oral presentation is also assessed. In the latter form of assessment, each presentation is judged on how well their presentation is organised, the quality of their individual presentations and visual aids and how well they are able to answer questions from the audience. Both forms of assessment have an equal weighting with regard to the module mark.

The thesis is assessed using a combination of their written work and an oral poster presentation. The oral poster presentation provides an opportunity for each student to present their thesis to members of staff, visiting aviation professionals and the external examiner. These oral presentations are judged on the basis of the quality of the presentation in terms of content and visual aids, how well the key findings and other important elements of the research been communicated and how well the student has responded to questions from the audience.

Assessment and ILO Mapping

A. Postgraduate Certificate

Award ILOs Module No.	ILO1	ILO2	ILO3	ILO4	ILO5
1					AO
2	ICW	ICW			
3	ICW	ICW	ICW	ICW	ICW
4	ICW	ICW	ICW	ICW	ICW
5	EX	EX	ICW		
6		ICW			
7	ICW	ICW	ICW	ICW	ICW
8	EX	EX			
9	ICW	ICW			
12	ICW	ICW	ICW		
13	ICW	ICW	ICW		GPRES
14	ICW	ICW			

13

Module No. / Award ILOs	ILO1	ILO2	ILO3	ILO4	ILO5
16	ICW	ICW			

B. MSc

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

Module No. / Award ILOs	ILO1	ILO2	ILO3	ILO4	ILO5	ILO6	ILO7
6		ICW					ICW
11			ICW	GCW	GPRES		
12	ICW	ICW	ICW			ICW	
13	ICW	ICW	ICW			ICW	
14	ICW	ICW				ICW	
15						ICW	
16	ICW	ICW				ICW	ICW
17					OR		THESIS

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

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

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

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

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

14

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.

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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.

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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>

Course graduates generally find suitable employment very quickly. Many continue employment with the organisations they were with when they began the course (changing direction towards safety/ Human Factors). Other former graduates are currently employed by various major airlines, within the rail industry, car manufacturers, defence, consultancy etc. These have included easyJet, Airbus graduate training, NATS graduate training, Baines Simmons, Metronet rail, Network Rail, EDF Energy, DHL and many others.

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:	Security Sector Management (East Africa)

Date of first publication/latest revision:	September 2005[1]/ September 2016

1. What is the course?

Course information

Course Title	Security Sector Management (East Africa)
Course code	MSSSAPTR, PDSSAPTR, PCSSAPTR
Academic Year	2017/18
Valid entry routes	PgCert[2], PgDip, MSc
Exit routes	PgDip and PgCert
Mode of delivery	Part-time
Location(s)[3] of Study	Addis Ababa, Ethiopia
School(s)	Cranfield Defence and Security
Theme	Defence and Security
Centre	Defence Management and Leadership
Course Director	Professor Ann Fitz-Gerald
Awarding Body	Cranfield University
Is this an AP Contract course?[4]	No
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ level 7 (Masters)

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[1] Date of first publication of the UK based flagship course
[2] Students register for PgCert in the first instance. Registration for PgDip is only possible on successful completion of the PgCert and registration for MSc is on y possible on successful completion of the PgDip.
[3] If any part of this course is delivered at another site, please note which one(s) here
[4] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

1

Benchmark Statement(s)	Business and Management
Registration Period(s) available	3 years
Course Start Month(s)	February

Institutions delivering the course

This course is delivered by the Centre for Defence Management and Leadership where the research interests include Security Sector Management, Security Sector Reform, Governance and Oversight, Economics of Security, Human Rights and Civil Society involvement in the Security Sector. The course is delivered in Addis Ababa, Ethiopia. The Course is a closed course, fully funded by HMG for students nominated by the Governments of Ethiopia, Djibouti, Somaliland, Rwanda, Kenya, Uganda, Burundi, Tanzania, Seychelles, Comoros, Mauritius, Madagascar.

Cranfield University interacts with the

The Ethiopian Ministry of Defence for facilitation of in-country administration such as provision of classroom, classroom materials, lunch, and beverages. A facilitation contract exists for this third party provision.

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. One module, Managing Security Sector Projects and Programmes, gives students the opportunity to qualify for the award of PMD Pro LEVEL 1.

2. What are the aims of the course?

- address the management challenges of international development and security interventions
- provide an analytical framework for the study of national security in a way which promotes growth and stability
- provide both knowledge and skillsets supporting an area of increasing international importance.

This programme is intended for the following range of students:

- recent graduates from undergraduate programmes who are interested in applying their disciplinary backgrounds to the wider multidisciplinary area of security sector management
- senior and mid-career professionals who wish to achieve higher post-graduate qualifications for progression in their current (or related) fields
- students wishing to enter the fields of diplomacy, politics and other forms of overseas work in the government and non-government sectors.

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

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

A. Postgraduate Certificate in Security Sector Management

2

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

ILO 1.   Explain the connections between security, development and conflict and interpret the way the discourse in the security sector is developing

ILO 2.   Relate management theories and techniques to national security provision in a range of transitional societies

ILO 3.   Critically analyse the impact of local and global factors, on national security strategies, national security institutions and civil society.

ILO 4.   Develop the ability to use evidence and to collect and analyse data using political science methodology in order to support security sector decision making globally, regionally, nationally and at the community level

B. Postgraduate Diploma in Security Sector Management

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

ILO 5.   Formulate contextualised plans for security sector strategies at strategic and programme levels, where this topic has not been taken in the PgCert programme.

ILO 6.   Critically analyse the impact of a wider range of factors to supplement those studies in the PgCert programme. These might include public security and the rule of law, the criminal justice system, information security and environmental security as well as further areas of management techniques such as risk management, resource management and project and programme management

C. MSc

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

ILO 7.   Plan, design and organise a research project to address a security sector management related topic.

4. How is the course taught?

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

* undertaking exercises relevant to the specific area of security being studied
* facilitated group discussions
* engaging in debates
* presentations from visiting speakers who will be subject matter experts

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

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

in Section 7. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

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

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

Description	Credits
COMPULSORY MODULES:	
Modules 1-6	60
ELECTIVE MODULES:	
N/A	
TOTAL:	**60**

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

Description	Credits
COMPULSORY MODULES:	
Modules 1-12	120
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	120
Dissertation	80
ELECTIVE MODULES:	
N/A	
TOTAL:	**200**

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

Pass Criteria

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

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

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does <u>not</u> have discretion to overrule this limit, but can refer a case to Senate's Education Committee); [5]
- **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 expected to complete the course within 3 years.

As the Course is a closed course, student progression will be managed continuously but within three defined stages. Students will initially only be registered for the PG Certificate. If the student successfully completes the 60 credits associated with the PG certificate he/she will transfer to be registered onto the PG Diploma. If the student successfully completes the 120 credits associated with the PG Diploma, he/she will transfer to the MSc.

The course is offered on a part-time basis. There are six, one-week long, residential schools. During the first residential week, the introductory module is delivered (Issues in International Security, Development and Conflict) along with the Study Skills & Research Methods Module. This follows the Cranfield University induction and an introductory session on academic skills. Each residential week following that consists of the delivery of two modules. Each module lasts three and a half days. The periods between residential schools allow time for independent

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[5] 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%).

learning, reflection and the completion of a written assignment and, in two modules, preparation for an examination.

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[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
1[13]	R-SSM-IISDC	Issues in International Security, Development & Conflict		25		10	N	[]	13/3/18]	16/3/18]	40% 40%	ICW EX	60 40				[30/04/18 19/05/18]	[25/06/18 11/08/18]
2	R-SSM-SSRM	Academic Skills and Critical		25		10	N	[]	18/03/18]	21/03/18]	40%	ICW	100				[29/05/18]	[23/07/18]

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[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.

[13] .

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

		Thinking																	
3	R-SSM-GRL	Governance and the Rule of Law		25		10	N	[]	20/05/18]	23/05/18]	40%	ICW	100					[02/07/18]	[28/08/18]
4	R-SSM-SPSD	Strategic Planning for Security and Development		25		10	N	[]	23/05/18]	26/05/18]	40% 40%	ICW GPRES	60 40					[06/08/18 26/05/18]	[17/09/18]
5	R-SSM-BSC	Building State Capacity		25		10	N	[]	12/08/18]	15/08/18]	40%	ICW	100					[24/09/18]	[19/11/18]
6	R-SSM-CML	Strategic Leadership and Managing Change		25	25	10	N	[]	15/08/18]	18/08/18]	40%	ICW	100					[29/10/18]	[18/12/18]
7	R-SSM-MMSSR	Managing Security Sector Resources: People, Organisations, Performance		25		10	N	[]	28/10/18]	31/10/18]	40%	ICW	100					[10/12/18]	[18/02/19]
8	R-SSM-MR	Managing Risk		25		10	N	[]	31/10/18]	03/11/18]	40%	ICW	100					[21/01/19]	[11/03/19]
9	R-SSM-ES	Economics of Security		25		10	N	[]	20/01/19]	23/01/19]	40% 40%	ICW GPRES	75 25					[04/03/19 23/01/19]	[06/05/19]
10	R-SSM-MIS	Managing Information Security		25		10	N	[]	23/01/19]	26/01/19]	40%	ICW	100					[08/04/19]	[03/06/19]
11	R-SSM-ENS	Environmental Security		25		10	N	[]	07/04/19]	10/04/19]	40%	ICW	100					[20/05/19]	[22/07/19]
12	R-SSM-	Managing Security Sector		25		10	N	[]	10/04/19]	13/04/19]	40%	ICW	100					[24/06/19]	[27/08/18]

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	MSSPP	Projects & Programmes															
13	R-SSM-DISS	Thesis		5		80	N	[]	14/04/19]	14/04/19]	50%	THESIS	100				[16/04/20]	[]

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

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/A			

7. **How are the ILOs assessed?**

The following assessment types are utilised:

- Individual written assignments (typically an essay) ranging from 2,000 – 3,000 words in length.
- In-class Group Presentations
- 3 hour closed book examinations
- For further details please see the Module Descriptions and the Course Structure.
- Formative assessments are also used

This approach has been adopted because:

Students often use the written assignments as a 'space' in which to apply the theories and concepts which they were presented with in class. The students typically use the written assignments to apply concepts and theories to their own professional context. The heavy focus on written assignments also prepares the students for developing their dissertation when they enter the MSc phase of the course. The 2 examinations and the group presentation work forms part of the assessment strategy as it is recognised that difference individuals prefer different styles 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

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

10

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
7	ICW	ICW
8	ICW	GPRES ICW
9	ICW	ICW
10	ICW,	ICW
11	ICW	ICW
12	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 7
13	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

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

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

Cranfield University's work in support of policymakers tackling today's most pressing operational challenges has involved a significant amount of interaction with global development actors, particularly in examining the mutually reinforcing relationship between security and development.

The MSc SSM course is designed to further the knowledge of decision-makers, both within government and in civil society.

Over the past decade, the SSM Group's research has highlighted the lack of education and training in the leadership, governance and management of broader security and development programmes. Thus, the MSc Security Sector Management addresses this gap and opens up opportunities to understand and apply useful concepts, tools and more holistic management approaches.

Cranfield University's work in support of policymakers tackling today's most pressing operational challenges has involved a significant amount of interaction with global development actors, particularly in examining the mutually reinforcing relationship between security and development.

The MSc SSM course is designed to further the knowledge of decision-makers, both within government and in civil society. Students graduating from this closed course will, in almost all cases, have existing positions their own official institutions. As a result of completing the Course, both armed forces and police officers, as well as civilian officials working in the sector, will be better suited for secondments to international organisations such the United Nations (UN) and the African Union. This is particular the case as professional and director level appointments in the UN require a higher university degree[14].

For those graduates seeking new opportunities, there are many types of employment to which a master's degree in security sector management opens doors for applicants. Security analysts in international companies, security risk managers and commercial policy advisers are amongst.

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 Strategic Marketing

Date of first publication/latest revision:	May 2017

1. What is the course?

Course information

Course Title	MSc in Strategic Marketing
Course code	MSSTMFTC, PDSTMFTC, PCSTMFTC
Academic Year	2017/18
Valid entry routes	MSc
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time
Location(s)[1] of Study	Cranfield Campus
School(s)	School of Management
Theme	Leadership and Management
Centre	Centre for Strategic Marketing Sales
Course Director	Dr Radu Dimitriu
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	Full-time MSc - one year
Course Start Month(s)	September

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[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 is delivered by School of Management primarily the Centre for Strategic Marketing and Sales with a variety of industry and practice-oriented research interests.

The Centre for Strategic Marketing and Sales: For over thirty years, Cranfield School of Management has been renowned throughout the world for its pragmatic, state-of-the-art approach to marketing and sales. Some of the world's foremost organisations from GFMCG through to not-for-profit have sponsored research through our Centre for Strategic Marketing and Sales (CSMS). The Centre focuses on the areas of marketing that are at the forefront of today's commercial environment, developing valuable ideas and new insights into current and future business practice.

The CSMS is also home to the following specialist research groups:

- Customer Management Forum
- Key Account Best Practice Club

Through our applied research, we feed best practice into our curriculum and make certain that it is second to none in dealing with practical and current marketing issues.

The experiences of our highly respected faculty and the crucial links we maintain with a diverse range of industries ensures that you receive a topical and global perspective of marketing, delivered by some of marketing's most highly respect and influential thinkers.

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

The School of Management has received accreditation from three high profile international organisations:

- EQUIS, the European Quality Improvement System, established by the European Foundation for Management Development (efmd).
- AACSB – Association to Advance Collegiate Schools of Business.
- AMBA - Association of MBAs

The School of Management is one of just a handful of schools to be accredited by the three accreditation bodies AACSB, AMBA and EQUIS.

The MSc in Strategic Marketing course also benefits from accreditation by the premier UK professional bodies in marketing Chartered Institute of Marketing (CIM) and the Market Research Society (MRS).

Candidates are able to undertake the MRS Advanced Certificate in Market and Social Research besides their MSc taught programme, on an optional basis. Students who have completed both the Advanced Certificate and the Cranfield MSc, and who have work experience in market research, are also encouraged to apply for membership

The course is also accredited with the CIM and students who have completed the Cranfield MSc in Strategic Marketing programme are eligible for maximum exemptions from the Chartered Institute of Marketing's Certificate in Professional Marketing (Level 4) and Diploma in Professional Marketing (Level 6). You are also encouraged to apply for membership.

2. What are the aims of the course?

Cranfield University offers this course in order to:

- Provide an advanced and thoroughly research-grounded marketing course for students preparing for a career in marketing or who are looking to advance their careers in marketing either in the UK or overseas.
- The course includes a Postgraduate Certificate and Postgraduate Diploma exit point for students who do not satisfactorily complete all components of the taught course element and the thesis. It is not intended that students will not join the course purely for the PgCert or PgDip, so it is an exit not entrance award gained after completing 60 credits for PgCert and 120 credits for PgDip.

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 prove:

ILO 1.   An ability to demonstrate a systematic application and a critical awareness of current research in strategic marketing, customer management and market analysis together with the capacity to evaluate its relevance to industrial and commercial practice.
ILO 2.   An ability to acquire and use information effectively in several media, including the increasing range of networked information resources.
ILO 3.   Originality in the application of knowledge, including data and information collected by the student, in relation to a series of projects focussing on live marketing problems.
ILO 4.   An independent learning ability and interest in advancing their knowledge and understanding and developing new skills to a high level.

B. Postgraduate Diploma

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

ILO 5.   Self-direction and originality in tackling and solving problems.
ILO 6.   Working effectively both individually and in teams at a professional level.
ILO 7.   Making informed judgements in the absence of complete data.
ILO 8.   The qualities and transferable skills necessary for employment requiring exercise of initiative and personal responsibility in a real world, marketing context.
ILO 9.   A conceptual understanding that enables the student to evaluate critically current research and/or methodologies, develop critiques of them and, where appropriate, adapt them in the contact of both advanced scholarship and their selected elective subject.

C. MSc

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

ILO 10.   Understand, have experience with, and confidently be able to apply marketing theories, tools and techniques and will have practised implementing these theories

and tools in a variety of situations including case studies, group projects and an individual thesis.

ILO 11. Demonstrate the ability to identify the appropriate marketing framework for the issue or situation under consideration, to apply the tool or technique accurately, and to develop appropriate marketing strategies using such frameworks.

ILO 12. Possess a comprehensive understanding of the leading academic research in the field of strategic marketing.

ILO 13. Display practical capabilities in marketing research: data gathering, data analysis and interpretation, report writing and presentation skills.

ILO 14. Demonstrate independent learning abilities in the practical application of marketing tools and techniques to current marketing issues.

ILO 15. Work effectively in teams

ILO 16. Demonstrate critical analysis skills in respect of case studies and group projects

ILO 17. Communicate clearly and effectively both orally and in writing and be able to make presentations appropriate for communication to their academic audience and to the practitioners in any organisations involved

4. How is the course taught?

Cranfield places great emphasis on personal development through a teaching style that sets us apart from our rivals. The programme has been developed to produce practical, proactive strategic marketers, so our teaching methods are specifically geared toward encouraging participation, self-development and team working.

Teaching and learning methods focus on the application of learning.

The acquisition of knowledge and understanding is achieved via taught lectures, learning from others in a small team environment (the Learning Team) and students' personal study.

Case studies and examples drawn from practice play a significant role in teaching and learning about translating theory into practice and about applying marketing frameworks to practical situations. Additional practical expertise will be provided through visiting lecturers.

The students are taught research methods as part of the thesis process. This includes critical literature appraisal and search methods. The thesis requires them to apply these skills.

Students are encouraged to reflect on their learning throughout the programme.

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

Description	Credits
COMPULSORY MODULES:	

Modules 1-12	130
Thesis (13)	70
ELECTIVE MODULES:	
N/A	N/A
TOTAL:	**200**

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

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

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

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does <u>not</u> have discretion to overrule this limit, but can refer a case to Senate's Education Committee);[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 around 11 calendar months. The course is run in either two streams or in only one stream (depending on the size of the cohort).

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[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	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**	
1	M-K/MSP	Marketing Strategy and Planning	Prof Hugh Wilson	25		10	N		02/10/17	13/10/17	40 40	ICW GCW	60 40				14/11/17 13.10.17	TBC TBC
2	M-K/MBC	Managing Brands	Dr Radu Dimitriu	25		10	N		16/10/17	03/11/17	40 40	ICW GCW	60 40				14/11/17 03/11/17	TBC TBC
3	M-K/IMC	Marketing Communications	Prof Paul Baines	25		10	N		17/10/17	08/11/17	40 40	ICW GCW	60 40				14/11/17 08/11/17	TBC TBC
4	M-K/AMR	Accounting for Marketing Managers	Dr Simon Templar	25		10	N		12/01/18	14/03/18	40	EX	100				Exam week	TBC

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

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

[7] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%. 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
																	19/03/18	
5	M-K/DMA	Big Data-Marketing Analytics	Dr Stan Maklan	25		10	N		28/11/17	08/12/17	40	EX	100				Exam week 11/12/17	TBC
6	M-K/CKM	B2B Customer and Key Account Management	Dr Rodrigo Guesalaga	25		10	N		22/01/18	06/02/18	40	ICW	100				16/02/18	TBC
7	M-K/CRM	Customer Relationship Marketing and Customer Experience	Dr Benedetta Crisafulli	25		10	N		16/11/17	28/11/17	40	ICW	100				15/12/17	TBC
8	M-K/RMM	Retailing and Omnichannel Management	Dr Tamira King	25		10	N		19/02/18	28/02/18	40	ICW	100				16/04/18	TBC
9	M-K/DIR	Digital Marketing	Daniel Rowles	25		10	N		29/01/18	09/02/18	40	ICW	100				02/03/18	TBC
10	M-K/SKM	Sales Management	Dr Rodrigo Guesalaga	25		10	N		08/01/18	19/01/18	40	ICW	100				16/02/18	TBC
11	M-K/MCP	Marketing Consulting Project	Dr Benedetta Crisafulli	10		10	N		05/03/18	12/03/18	40 40	GPRES ICW	50 50				12/03/18 23/03/18	TBC TBC
12	M-K/RIS	Research, Insight and Statistics	Prof Paul Baines	40		20	N		09/04/18	08/06/18	40 40	ICW ICW	50 50				08/06/18 08/06/18	TBC 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	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	M-K/THS	Thesis – review and submission process	Dr Benedetta Crisafulli	10		70	N		09/04/18	31/08/13		THESIS	100				31/08/18	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

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/A	N/A	N/A	N/A

7. **How are the ILOs assessed?**

The following assessment types are utilised:

Individual Coursework, Group Coursework, Group Presentation, Examination and Thesis.

This approach has been adopted because:

To encourage different ways of learning and to probe the achieved learning from different perspectives.

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.	ILO1	ILO2	ILO3	ILO4	ILO5	ILO6	ILO7	ILO8	ILO9	ILO10	ILO11	ILO12	ILO13	ILO14	ILO15	ILO16	ILO17
	Postgraduate Certificate				Postgraduate Diploma					MSc							
1		✔	✔	✔		✔	✔	✔		✔				✔	✔	✔	✔
2		✔	✔	✔		✔	✔	✔		✔				✔	✔	✔	✔
3		✔	✔	✔		✔	✔	✔		✔				✔	✔	✔	✔
4		✔		✔	✔									✔			
5			✔		✔			✔			✔			✔			✔
6	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔			✔	✔	✔	✔
7		✔		✔	✔	✔		✔		✔				✔	✔		✔
8		✔	✔	✔	✔	✔				✔	✔			✔	✔	✔	✔
9		✔	✔	✔	✔	✔		✔		✔				✔			✔
10	✔		✔	✔	✔	✔	✔		✔	✔	✔	✔		✔	✔	✔	✔
11		✔	✔	✔		✔	✔	✔		✔	✔			✔	✔	✔	✔
12			✔	✔	✔		✔	✔	✔		✔		✔			✔	✔
13	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔			✔

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

Title	Modules Covered	Assessment	
		Type	Weight (%)
Integrated Individual Report	M-K/CKM B2B Customer and Key Account Management M-K/SKM Sales Management	ICW	100
Individual Planning Report and Team Debates	M-K/MSP Marketing Strategy and Planning M-K/MBC Managing Brands M-K/IMC Marketing Communications	Individual Report	60
		Team Debates	40

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?

According to the latest study of our graduate careers by the Career Development Service, 93% of the MSc in Strategic Marketing class of 2014/15 were employed within three months of formal graduation.

48% of students changed country after graduation and 36% of non-UK based students were employed in the UK. The average global basic salary post course was £32,000, and the average total salary increase after Cranfield was £16,000.

The average age of the cohort was 24 years and 59% of the course was female.

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:	STREAM

Date of first publication/latest revision:	Oct 2016

1. What is the course?

Course information

Course Title	STREAM
Course code	DESTRFIC
Academic Year	2017/18
Valid entry routes	EngD
Additional exit routes	EngD
Mode of delivery	Full-time
Location(s)[1] of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Water
Centre	Cranfield Water Sciences Institute
Course Director	Dr Pablo Campo 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 8
Benchmark Statement(s)	N/A
Registration Period(s)	4 years FT

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[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

STREAM EngD COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 August 2017   Course / SAS Version: Version 1.0 - 31.1.17

available	
Course Start Month(s)	October

Institutions delivering the course

This course is delivered by the STREAM Industrial Doctorate Centre and the School of Water, Energy and Environment where the research interests include water science and engineering

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

The **Stream Programme** is coordinated by Cranfield University but is delivered by five UK academic centres: Cranfield, Imperial College London and the universities of Sheffield, Newcastle, and Exeter

Cranfield University remains partly 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.

It is a member of the Association of Engineering Doctorates

2.   What are the aims of the course?

To facilitate a three/four year programme during which the Engineering Doctorate (four year programme) and PhD (three year programme) students undertake a research degree awarded for industrially relevant research, based in industry and supported by a programme of professional development courses. PhD students may sit in on the modules if they wish but will not be assessed.

EngD students, at the discretion of the exam board, may leave with the lower award of PhD.

This programme is intended for the following range of students:

Doctoral level researchers

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

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

A.   **Engineering Doctorate**

In completing this course, and achieving the associated award, a diligent student should be able to:
  ILO 1.   Initiate and create new knowledge, through original research, delivered to a quality to satisfy peer review
  ILO 2.   Demonstrate a systematic approach to acquisition and interpretation of knowledge of an academic discipline

ILO 3.   Conceptualise, design and implement methods for the collection of new knowledge

ILO 4.   Apply expert knowledge in one or more specialist fields and be able to deploy methods and techniques that balance social, environmental, economic, and engineering considerations

4. How is the course taught?

This is a research degree. However, four year EngD Research Engineer's will undertake a taught semester (October-December of their first year) attending five taught modules and undertaking a group design project. Registered PhD and EngD students are also expected to undertake a Transferable Skills & Engineering Leadership (TSEL) programme which is spread across the duration of their registration and some elements of this are run at the Partner Universities.

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.   Engineering Doctorate
The accumulation of 100 Credits is required to complete the programme through the assessment of taught modules as detailed below.

Description	Credits
COMPULSORY MODULES:(M Level)	
[1] Group Design Project	10
[2] Transferable Skills & Engineering Leadership	40*
[3] Water & Wastewater Treatment Principles	10
[4] Process Science and Engineering	10
[5] Hydraulics and Pumping Systems	10
[6] Risk Management and Reliability Engineering	10
[7] Asset Management, Policy and Strategy	10
ELECTIVE MODULES:	
Two additional M level technical modules from an approved list of MSc Courses (can be taken at any one of the five partnering Universities)	Attendance Only
TOTAL:	60

*Different Units of the TSEL are taught at the partnering Universities. TSEL is assessed by the host institution at the end of the course

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

For individual modules:

3

- A mark of ≥50% is required to pass the assessment, however:
  - the stated minimum mark for each individual assessment must be attained (this is normally 40% but in some cases will be clearly stated as 50%);[3]
  - where the stated minimum mark is 40%, a mark of 40-49% will be automatically compensated providing that overall your average mark (including the failed assessment(s)) is ≥50%: a mark of <40% will require the assessment to be re-taken (subject to the limitations outlined in Section 4)[4];
  - where the stated minimum mark is 50%, a mark of <50% will require the assessment to be re-taken (subject to the limitations outlined in Section 4).

- The marks of a re-take (or re-submission) of an assessment will be capped at 50%. Providing the minimum mark is met, re-take marks within the range of 40-49% will be automatically compensated providing that overall your average mark (including the failed assessment(s)) is ≥50%;

- Any re-take assessment will be of the same assessment type as the original failed assessment and be either:
  - a new (and different) examination; or
    - a new (and different) piece of submitted work;
    - a revision of the work submitted originally.

- A first instance of a failure to submit or attend an assessment would be permitted a further opportunity to submit or attend, but the marks obtained will be capped at 50%. Further instances of failure to attend or submit across the course would <u>not</u> entitle you to any further assessment opportunities and would normally mean that you would not gain the credits and therefore would fail the award.

- Failure to attain the minimum mark or failure to submit on the second attempt would normally mean that you would fail the module and the intended award.

Substantial pieces of assessment (pieces of assessment corresponding to ≥40 credits)

- A mark of ≥50% is required to pass the assessment. A mark of 40-49% cannot be compensated by performance in other modules.

- A mark of <50% will normally result in an opportunity to re-take the assessment or an opportunity to revise and represent the original work (this will be defined in your course handbook), in both cases with the re-take mark capped at 50%. The board of examiners reserve the right to fail a mark of <40% without a second assessment opportunity.

- A first instance of a failure to submit or attend an assessment would be permitted a further opportunity to submit or attend, but the marks obtained will be capped at 50%. Further instances of failure to attend or submit across the course would <u>not</u> entitle you to any further assessment opportunities and would normally mean that you would not gain the credits and therefore would fail the intended award.

- Failure or failure to submit on the second attempt would normally mean that you would fail the intended award.

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[3] See footnote 7.

[4] You will not be offered the opportunity to re-take any assessment which is compensatable. However at the discretion of the Board of Examiners or by BoE Chair's Action you may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of your other taught modules would not allow you to qualify for your award (<50%).

5. How is the course structured?

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

STREAM REs will spend their first semester (Oct – Dec) at Cranfield attending modules on core technical competencies and early stage transferable skills. Attendance on the Induction Semester and completion of associated assessments are both compulsory elements of the programme.

Subsequent to the induction semester, all STREAM REs attend any number of Masters level modules which are part of a STREAM recognised MSc course (see table below). REs will attend a minimum of one such module in their second and third years of study. Attendance at additional modules must be authorised by the RE's principal supervisor. Formal assessment for these post-induction modules is not compulsory. Where assessment is undertaken it may be in any form agreed to by the primary supervisor. REs will receive certificates of attendance for each module that they attend. Where they successfully pass the normal assessment for that module they will be supplied with an accreditation certificate from the institution offering the module.

List of recognised MSc courses which STREAM REs are able to attend

Institution / School	MSc course
University of Sheffield - Department of Civil and Structural Engineering	▪ Urban Water Engineering and Management
Newcastle University – School of Civil Engineering and Geosciences	▪ Sustainable Management of the Water Environment ▪ Environmental Engineering ▪ Hydroinformatics ▪ Applied Hydrogeology
Imperial College London - Department of Civil and Environmental Engineering	▪ Hydrology and Water Resources Management ▪ Environmental Engineering
Cranfield University – Centre for Water Science, School of Applied Sciences.	▪ Water & Wastewater Engineering
University of Exeter - School of Engineering, Computing & Mathematics.	▪ Urban Water Systems

The TSEL component of the STREAM programme comprises attendance at one course at Cranfield during the induction semester plus one course at Imperial College later in the first year of registration, one course at the University of Sheffield during Year 2, one course at the University of Exeter in Year 3, and one course at Newcastle University in Year 4. Attendance on STREAM TSEL components and completion of associated assessments are both compulsory elements of the programme. Records of attendance on TSEL activities and associated assessment marks will be recorded on RE CPD logs.

Doctoral level research: Candidates will conduct either a single study or a portfolio of studies to be reported on in a thesis. Formal assessment will involve a Viva Voce defence of the thesis with one internal examiner and two external examiners, where no more than one external examiner can be nominated from a university in the STREAM consortium and none of the examiners can have served on the RE's supervisory panel.

5

Course modules

The following modules outline all compulsory parts of the programme leading to an **EngD**. 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 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
7	I-UAM-A1001	Asset Management, Policy and Strategy	Dr Ewan McAdam	27		10	N		4/12/17	8/12/17	40	ICW	100				6/1/2018	June 2018
3	I-WSC-A1096	Water and Wastewater Treatment Principles	Dr Jitka MacAdam	30		10	Y		9/10/17	13/10/17	40	ICW	100				21/10/17	June 2018

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[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

STREAM EngD COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 August 2017

Course / SAS Version: Version 1.0 - 31.1.17

4	I-WSC-A1093	Process Science and Engineering	Dr Marc Pidou	25		10	Y	23/10/17	30/10/17	3/11/17	40	EX	100				Exam week comm. 2/1/18	Sept 18
6	I-WSC-A1095	Risk Management and Reliability Engineering	Dr J MacAdam	30		10			20/11/17	24/11/17	40			100	GCW ICW	70 30	16/12/17	June18
5	I-WSC-A1507	Hydraulics and pumping systems	Dr I Carra	27		10	Y		6/11/17	0/11/17	40	ICW	100				18/11/17	June 18
1	I-STR-GDP	Group Design Project	Dr Ewan McAdam	30		10	N		10/11/17 25/9/17	18/12/17	50			100	IPRES GCW	20 80	14/12/17 15/12/17	
2	I-STR-TSEL	Transferable Skills and Engineering Leadership	Dr Ewan McAdam	29		40*	N		2/10/17	2/7/21	40	ICW	100				2/7/2021	

*Different Units of the TSEL are taught at the partnering Universities. TSEL is assessed by the host institution at the end of the course

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

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-WSC-A1096	Water and Wastewater Treatment Principles	Water and Wastewater Engineering	STREAM EngD
I-WSC-A1093	Process Science and Engineering	Water and Wastewater Engineering	STREAM EngD
I-WSC-A1095	Risk Management and Reliability	Water and Wastewater Engineering	Environmental Engineering STREAM EngD
I-WSC-A1507	Hydraulics and Pumping Systems	Water and Wastewater Engineering	STREAM EngD

7. How are the ILOs assessed?

The EngD students are expected to undertake 5 compulsory taught modules, a group project and transferable skills and leadership plus 2 other taught modules.

There is a requirement for students to undertake these modules however the overall the research EngD is assessed by a viva in line with the university regulations for a doctorate level research degree

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?

9

Primarily UK Water Industry in various roles: research, engineering consultancy, water utility, second tier provider, regulator.

COURSE SPECIFICATION

Cranfield University: Course Specifications

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

COURSE TITLE: PgCert in Supply Chain Practice

Date of first publication/latest revision: 5th July - Ver 13

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1. **What is the course?**

Course information

Course Title	PG Certificate in Supply Chain Practice
Course code	enter here
Academic Year	2016-2017
Valid entry routes	PgCert
Additional exit routes	None
Mode of delivery	Part-time
Location(s)[1] of Study	Cranfield University
School(s)	School of Management
Theme	Leadership and Management
Centre	Logistics, Procurement and Supply Chain Management
Course Director	Mike Bernon
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 - closed
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	One year

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[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

Supply Chain Practice COURSE SPECIFICATION
QA&E USE ONLY: Version 1.0 July 2017   Course / SAS Version: 1

Course Start Month(s)	September start for cohort 1, then as agreed with client for additional cohorts

Institutions delivering the course

This course is delivered by School of Management, Leadership and Management, TLG Logistics, Procurement and Supply Chain Management where the research interests include:
Supply Chain Management, Logistics and Procurement

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

- Students undertake their individual work based project within their own organisation or field of business, which builds further contacts and opportunities for collaboration with those organisations
- The course may contain talks by external speakers from organisations such as: consultancies, industrial practice or partner academic institutions
- One of the two external examiners for the course is always from the non-academic sector, the other being an academic
- The course has an industrial Advisory Board

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

The MSc. in Logistics and Supply Chain Management is formerly accredited by the Chartered Institute of Logistics and Transport until 2021 and the Chartered Institute of Purchasing and Supply until August 2017.

Currently the proposed programme is not accredited by these professional bodies but as it is closely aligned to the MSc. in Logistics and Supply chain Management we would seek accreditation.
Chartered Institute of Logistics and Transport and Chartered Institute of Purchasing and Supply

2. What are the aims of the course?

The aim of the course is to bridge a gap for accredited executive education programmes, in order to fill a market demand for highly capable practitioners in the field of logistics and supply chain management. The course further aims to offer personal and specialised skills development for candidates with extensive industrial experience. These objectives are addressed through the aims of the course which are to provide students with:
- An overall appreciation of logistics and supply chain management and their importance to business
- Appropriate technical knowledge in the key areas of logistics and supply chain management practice
- An understanding of the analytical skills that will enable them to apply this knowledge within a business environment
- An understanding of the key operational elements needed to effectively manage and plan logistics and distribution systems

This is a closed programme intended for the following range of students from the client organisation and their supply chain network:

1. Candidates with a minimum of 5 years' business or organisation experience in supply chain related role
2. Candidates with a similar level of experience in a non-supply chain area who are intending to move into the supply chain field.

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

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

A. PgCert

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

ILO 1. Demonstrate a systematic understanding of logistics and supply chain knowledge in general, and a critical awareness of current supply chain problems and new thinking at the forefront of the discipline.

ILO 2. Identify appropriate techniques to address specific challenges in supply chain management.

ILO 3. Analyse and solve supply chain problems systematically.

ILO 4. Make reasoned judgements in the absence of complete data.

ILO 5. Critically evaluate the application of current logistics and supply chain management research and evaluate its relevance to organisational practice.

ILO 6. Effectively communicate their work clearly to specialist and non-specialist audiences via oral, written presentations and reports.

4. How is the course taught?

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

Conventional taught lectures, business simulations, case studies, group working which will compromise four ten credit taught modules. Tutorial support will also be provided throughout the course including a meeting with a personal tutor during each module. Additional learning and personal development will be achieved through a 20 credit company based project which will be supervised by a Cranfield academic. Further, use will be made 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:

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

Description	Credits
COMPULSORY MODULES:	
Elements 1 to 4 Element 5	40 20
ELECTIVE MODULES:	
N/A	
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).

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[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%).

Supply Chain Practice COURSE SPECIFICATION
QA&E USE ONLY: Version 1.0 July 2017   Course / SAS Version: 1

6. How is the course structured?

Part-time students register for the course at a time agreed with the client and are expected to complete the course within one year.

Course modules

The following modules outline all parts of the programme leading to PgCert.
This is a closed PgCert being offered to individual client organisations. As such, this course does not have fixed (recurrent) module dates so the dates below are purely illustrative. However, the elapse time between modules will not normally be less than 6 weeks to allow for sufficient time for assessment and feedback prior to the next module.

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
0		Induction	Mike Bernon	4		0		25th Sept 2017										

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[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
1	Await code	Supply Chain Practice	Denyse Julien	25	0	10	N	26th Sept 2017	26th Sept 2017	28th Sept 2017	50	ICW	100				2nd November 2017	
2	Await code	Inventory and Operations Management Practice	Emel Aktas	25		10	N	28th November 2017	28th November 2017	30th November 2017	40	ICW	100				4th January 2018	*See note below table
3	Await code	Logistics Management - Freight Transport	Melvyn Peters	25		10	N	6th February 2018	6th February 2018	8th February 2018	40	ICW	100				15th March 2018	*See note below table
4	Await code	Logistics Management – Warehousing and DC Design	Hendrik Reefke	25		10	N	10th April 2018	10th April 2018	12 April 2018	40	ICW	100				17th May 2018	*See note below table
5	Await code	Independent Project-Supply Chain Practice	Mike Bernon			20	N	12th April 2018	Non residential	Non residential	50	IPROJ IPRES	80% 20%				12th August 2018	*See note below table

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

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

7. How are the ILOs assessed?

The following assessment types are utilised:

The course uses two assessment types. These include 4 individual written assessments and an independent project. The written assessments are based on practical case studies requiring the application of both qualitative and quantitative approaches. The independent project builds upon this by evaluating student's ability to apply their learnt knowledge to an industrial based project. It further tests their presentation and communication skills.

This approach has been adopted because:

This approach conforms to School of Management norms for post graduate programmes study and aligns to the MSc in logistics and Supply Chain Management.

Assessment and ILO Mapping

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

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

For Example:

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

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

Award ILOs / Module No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
1	ICW1	ICW1				
2		ICW2	ICW2			
3		ICW3	ICW3	ICW3		
4		ICW4	ICW4	ICW4		
5		IPROJ	IPROJ	IPROJ	IPROJ	IPROJ IPRES

Supply Chain Practice COURSE SPECIFICATION
QA&E USE ONLY: Version 1.0 July 2017   Course / SAS Version: 1

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.

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

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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.

The PgCert programme will be incorporated into the Supply Chain Management & Logistics programme review process given the high level of commonality across programmes.

Module feedback forms will be completed through the Evasys systems used in SoM. Feedback is then distributed to the Course Director. Module Leader/Lecturers and the Dir. Of Education. These are reviewed and any actions communicated back to students by the Course Director. The same module feedback is used for the Annual Course Reviews and any actions reported through the Graduate Programmes Board (Quarterly). As a "closed" programme the sponsoring company will also be able to provide any additional feedback directly to the Course Director.

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

The graduates from the PgCert in Supply Chain Practice will typically have significant work experience but not possess a higher (M) level degree. Further, this experience is often within one area of their business. By successfully completing the programme, graduates will have a deeper understanding and technical ability within their business area, along with an improved appreciation of wider supply chain management principles leading to opportunities for rapid career progression.

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:	Systems Engineering for Defence Capability

Date of first publication/latest revision:	29/09/2017

1. What is the course?

Course information

Course Title	Systems Engineering for Defence Engineering
Course code	MSSECFTR – PDSECFTR – PCSECFTR – MSSECPTR – PDSECPTR – PCSECPTR - SPSECPTR
Academic Year	2017-18
Valid entry routes	MSc, PgDip, PgCert, Short course for credit
Additional 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	Centre for Systems Engineering
Course Director	Dr Tim Ferris
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; additionally an IELTS score of 7.0 is 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

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[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)	September and January

Institutions delivering the course
This course is delivered by Centre for Systems Engineering where the research interests include systems analysis and development, systems thinking, architecture and test and evaluation.

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

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

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is accredited formally by IMechE and IET until 2018.

2. What are the aims of the course?

Cranfield University offers this course in order to teach graduates the principles, procedures and practices of Systems Engineering in the defence context. It offers some choice and specialisation to students having different backgrounds, interests or specific requirements. The Postgraduate Diploma (PgDip) and Postgraduate Certificate (PgCert) exit routes are provided for students who wish to access only parts of the course provided.

The programme is intended for the following range of students:

- recent graduates wishing to extend their knowledge and skills in the above areas
- experienced and or qualified engineers and scientists wishing to apply their skills in new areas
- the courses are targeted at people who will be able to add real value to the delivery of through-life defence capability in general and to their subsequent appointments in defence ministries, procurement and logistics agencies, defence science and technology organisations or defence industry in particular.

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.   distinguish between systems and complex systems

ILO 2.   recognise complex systems and their associated problems

ILO 3.   design cost-effective, timely and effective complex systems

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ILO 4.   defend adopting a systems approach over other methods of solving complex systems problems

ILO 5.   analyse the principal influences and constraints on the modern defence environment

ILO 6.   use Systems Engineering methods to explore defence lifecycle issues

ILO 7.   apply systems knowledge and systems thinking to the decision making process in relation to systems' problems in a constantly changing defence environment comprising people, doctrine, technology, time and budget

ILO 8.   formulate a Systems Engineering approach to Through Life Management Planning, Requirements Engineering, System Design, Trade- offs, Verification, Validation and Integrated Test and Evaluation

ILO 9.   assemble stakeholder needs and constraint, making appropriate use of requirements management techniques

B. Postgraduate Diploma

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

ILO 10.   analyse realistic problems which occur in a constantly changing defence environment (comprising people, doctrine, technology, time and budget) and may be solved using complex decision-making processes

ILO 11.   organise a tailored, whole system, through-life approach to explore a complex problem, using appropriate methods and tools

ILO 12.   judge the quality of Systems Engineering practices applied by industry and government in the defence environment

ILO 13.   propose a practical systems approach to accommodate both industrial and governmental ideology

ILO 14.   assess risk and uncertainty in complex systems

ILO 15.   propose suitable resources to mitigate risk and uncertainty in complex systems

ILO 16.   construct simple models, using modern techniques, tools and processes such as Synthetic Environments, to facilitate Defence Acquisition

ILO 17.   appraise Systems Engineering published work to justify and support their line of reasoning

ILO 18.   express effectively, through oral and written communication, their justified line of reasoning.

ILO 19.   critically analyse practical situations requiring complex decision-making to solve dynamic systems problems involving people, doctrine, technology, time and cost

ILO 20.   organise a balanced, whole system, through life approach and exploit appropriate methods and tools

ILO 21.   critically compare and contrast industrial best practices in Systems Engineering with Defence Acquisition and propose how to achieve a practical systems approach

C.   MSc

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

ILO 22.   Recognise a complex Systems Engineering problem which can be solved using knowledge acquired during the taught phase of the course

ILO 23.   assess evidence gathered through self-directed research

ILO 24   defend the validity of their conclusions in relation to their chosen complex Systems Engineering problem

ILO 25.   assemble evidence to support their line of reasoning and conclusions for their chosen complex Systems Engineering problem in conjunction with dependent and independent learning abilities

ILO 26.   write a thesis to convey their problem, assessment, defence and conclusions associated with their identified complex Systems Engineering problem

4. How is the course taught?

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

- use of the 'Virtual Learning Environment' (VLE) to deliver additional resources such as online questionnaires, forums and quizzes will be added to supplement and augment those used in classroom based learning
- use of group exercises where students investigate topics while undertaking certain modules and then presenting their findings back to their peers and academics. Such group research would typically utilise on-site library facilities and the digital library access to the Defence Technology School, where military equipment is available and used for some modules
- discussion sessions regarding Systems Engineering theory and practice used in defence environments
- participation in the course by a range of students from serving Military Officers, civilian MOD employees and students from defence companies, both UK and Foreign, so providing a forum to raise current issues and comment on the latest developments from different perspectives
- the Systems Engineering for Defence Capability suite of courses benefit from having the provision of a Flexible Education Coordinator who provides guidance and support to students undertaking the different routes.

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:	
Systems Approach to Engineering	10
Lifecycle Processes Introduction	10
Lifecycle processes Advanced	10
Applied Systems Thinking	10
ELECTIVE MODULES:	
Modules to the value of 20 credits, with no more than 10 credits selected from the DAM Electives selected from :	
:	
Availability, Reliability, Maintainability and Support Strategy	10
Capability Context	10
Decision Analysis, Modelling and Support	10
Human Centric Systems Engineering	10
Model Based Systems Engineering	10
Networked and Distributed Simulation	10
Systems of Systems Engineering	10
Simulation and Synthetic Environments	10
Systems Engineering and Software	10
Systems Engineering Workshop	10
DAM ELECTIVES	
The International Dimensions of Defence Acquisition	10
Knowledge in Defence	10
Programme and Project Management	10
Supply Network Management in Defence and Commercial Environment	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:	
Systems Approach to Engineering	10
Lifecycle Processes Introduction	10
Lifecycle processes Advanced	10
Capability Context	10
Applied Systems Thinking	10
Advanced Systems Engineering Workshop	20
ELECTIVE MODULES:	
Modules to the value of 50 credits, with no more than 20 credits selected from the DAM Electives selected from : Availability, Reliability, Maintainability and Support Strategy Decision Analysis, Modelling and Support	10

Description	Credits
Human Centric Systems Engineering	10
Model Based Systems Engineering	10
Networked and Distributed Simulation	10
Systems of Systems Engineering	10
Simulation and Synthetic Environments	10
Systems Engineering and Software	10
Systems Engineering Workshop	10
	10
DAM ELECTIVES	
The International Dimensions of Defence Acquisition	10
Knowledge in Defence	10
Programme and Project Management	10
Supply Network Management in Defence and Commercial Environment	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:	
Systems Approach to Engineering	10
Lifecycle Processes Introduction	10
Lifecycle processes Advanced	10
Capability Context	10
Applied Systems Thinking	10
Advanced Systems Engineering Workshop	20
Thesis	80
ELECTIVE MODULES:	
Modules to the value of 50 credits, with no more than 20 credits selected from the DAM Electives selected from :	10
Availability, Reliability, Maintainability and Support Strategy	10
Decision Analysis, Modelling and Support	10
Human Centric Systems Engineering	10
Model Based Systems Engineering	10
Networked and Distributed Simulation	10
Systems of Systems Engineering	10
Simulation and Synthetic Environments	10
Systems Engineering and Software	10
Systems Engineering Workshop	
DAM ELECTIVES	
The International Dimensions of Defence Acquisition	10
Knowledge in Defence	10
Programme and Project Management	10
Supply Network Management in Defence and Commercial Environment	10

TOTAL:	200

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

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

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

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

- MSc course within 48 weeks
- PgDip within a minimum of 24 weeks and a maximum of 40 weeks

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[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%).

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- PgCert within a minimum of 12 weeks and a maximum of 20 weeks depending on the optional module chosen.

The course is also offered on a part-time basis. The MSc part-time variant is completed over a period of 3 to 5 years. Whilst students are registered for 5 years, the normal time to complete the taught phase of the course part-time is 3 years, with a minimum time of 2 years. For the PgDip the part-time variant is completed in 2 to 4 years; the maximum period of registration allowed is 4 years. For the PgCert the part-time variant is normally completed in 2 years; the maximum period of registration allowed is 3 years.

A 10 credit module is taught over a period of one week with 5 credit and 20 credit modules prorata.

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.

8	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	R-SEDC-SAE	Systems Approach to Engineering		65		10	N	[A:04/09/17 B:08/01/18]	[04/09/17 08/01/18]	[15/09/17 19/01/18]	50 50	ICW ICW	100 100				[25/09/17 FT 23/10/17PT 26/02/18PT]	[26/02/18 18/19]
2	R-SEDC-LPI	Lifecycle Processes Introduction		35		10	N	[A18/09/17 B:22/01/18]	[N/A N/A]	[ ]	50 50	ICW ICW	100 100				[02/01/18FT/ PT]	[14/05/18 18/19]

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[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,

8	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
																	14/05/18]	
3	R-SEDC-LPA	Lifecycle Processes Advanced		35		10	N	[A:30/10/17	[04/12/17	[08/12/17	50	ICW	100				[18/12/17FT 19/01/18PT	[18/03/18
								B:29/01/18]	05/03/18]	09/03/18]	50	ICW	100				18/04/18]	18/19]
4	R-SEDC-CC	Capability Context		35		10	N	[A:11/09/17	[16/10/17	[20/10/17	50	ICW	100				[30/10/17FT 27/11/17PT	[30/07/18
								B:14/05/18]	18/06/18]	22/06/18]	50	ICW	100				30/07/18 PT]	18/19]
5	R-SEDC-AST	Applied Systems Thinking		60		10	N	[A:09/10/17	[13/11/17	[17/11/17	50	ICW	70				[27/11/17FT 28/12/17 PT 17/11/17	[23/05/18
											50	GPRES	30					
								B:05/03/18]	09/04/18]	13/04/18]	50	ICW	70				23/05/18 13/04/18]	18/19]
											50	GPRES	30					
6	R-SEDC-SEWN	Systems Engineering Workshop		37		10	N	[A: 04/12/17	[08/01/18	[12/01/18	40	GCW	30				[12/01/18 22/01/18 FT 19/02/18PT	[18/05/18 24/07/18
											40	ICW	70					
								B: 09/04/18	14/05/18]	18/05/18]	40	GCW	30				18/05/18	18/19
											40	ICW	70					18/19]

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,

8	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%	Assessment — 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
																	26/06/18]	
7	R-SEDC-ASEW	Advanced Systems Engineering Workshop		100		20	N	[A:25/09/17	30/10/17	10/11/17	50 50 50	GCW GPRES ICW	25 25 50				[10/11/17 10/11/17 18/12/17 PT	[27/04/18 27/04/18 14/05/18FT 06/06/18
								B:12/03/18]	16/04/18]	27/04/18]	50 50 50	GCW GPRES ICW	25 25 50				27/04/18 27/04/18 14/05/18FT 06/06/18PT]	18/19 18/19 18/19]
8	R-SEDC-ARMSS	Availability, Reliability, Maintainability& Support Strategy		35		10	Y[12]	[A:21/08/17	25/09/17	29/09/17	40	ICW	100				[06/11/17PT	[19/03/18
								B:01/01/18]	05/02/18]	09/02/18]	40	ICW	100				19/03/18FT 19/03/18 PT]	18/19]
9	R-SEDC-DAMS	Decision Analysis, Modelling and Support		30		10	Y[13]	[A 04/09/17	09/10/17	13/10/17	40	ICW	100				[20/11/17PT	[26/03/118
								B: 08/01/18	12/02/18]	16/02/18]	40	ICW	100				26/03/18 FT 26/03/18PT]	18/19]

[12] This module shares a large proportion of its teaching with R-ESD-RSE but the assessment and ILOs are different.

[13] This module shares a large proportion of its teaching with R-AMOR-DA but the assessment and ILOs are different.

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	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
10	R-SEDC-HCSE	Human Centric Systems Engineering		35		10	Y	A 09/10/17	13/11/17	17/11/17	40	ICW	100				28/12/17PT	02/05/18
								B:12/02/18	19/03/18	23/03/18	40	ICW	100				23/04/18FT 02/05/18PT	18/19
11	R-SEDC-MBSE	Model Based Systems Engineering		40		10	N	A:28/08/17	02/10/2017	06/10/17	40	ICW	100				13/11/17PT	16/04/18
								B:29/01/18	05/03/18	09/03/18	40	ICW	100				16/04/18FT 18/04/18PT	18/19
12	R-AMOR-NDS Occ A	Networked Distributed Simulation		30		10	Y	22/01/18	26/02/18	02/03/18	40	ICW	100				12/03/18FT 09/04/18 PT	18/19
13	R-SEDC-SOSE	System of Systems Engineering		35		10	N	11/06/18	16/07/18	20/07/18	40	ICW	100				28/08/18 PT	18/19
14	R-SEDC-SSE	Simulation and Synthetic Environments		30		10	Y[14]	A:07/08/17	11/09/17	15/09/17	40	ICW	100				25/09/17FT 23/10/17	26/03/18
								B:11/12/17	15/01/18	19/01/18	40	ICW	100				26/02/18FT 26/02/18PT	18/19

[14] This module shares a large proportion of its teaching with R-AMOR-FMS but assessment and ILOs are different.

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 | | | | | | |
| | | | | | | | | Module Start Date (eg Pre-course task) | 'Residential' Start Date | 'Residential' End Date | | Independent Assessment | | Multi-part Assessment | | | Submission dates | |
8												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
15	R-SEDC-SEAS	Systems Engineering and Software		37		10	N	[15/01/18]	[19/02/18]	[23/02/18]	40	ICW	100				[04/04/18PT]	[18/19]
16	R-DAM-IDDA	The International Dimensions of Defence Acquisition Environment		30	0	10	Y	[18/12/17]	[22/01/18]	[26/01/18]	40	ICW	100				[05/03/18]	[Tba]
17	R-DAM-MKIDA	Knowledge in Defence		30	0	10	Y	[19/02/18]	[19/03/18]	[23/03/18]	40	ICW	100				[30/04/18]	[Tba]
18	R-DAM-PPM	Programme and Project Management		30	0	10	Y	[14/05/18]	[18/06/18]	[22/06/18]	80 20	ICW GCW	100				[30/07/18 30/07/18]	[Tba]
19	R-DAM-SNMCE	Supply Network Management in Defence and Commercial		30	0	10	Y	[06/08/18]	[10/09/18]	[14/09/18]	40	ICW	100				[22/10/18]	[Tba]
20	R-SEDC-PSW	Thesis Selection Workshop		20	0	0	N	[A 06/11/17	[11/12/17]	[15/12/17]		AO					[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,

8	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
								B 28/05/18]	02/07/18]	06/07/18]		AO					N/a]	
21	R-SEDC-DISS	Thesis		20	0	80	N	[]	[11/12/17]	[30/07/18]	50	THESIS	100				[30/07/18]	[]

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,

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

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
R-AMOR-NDS	Networked and Distributed Simulation	Defence Simulation and Modelling (AMOR Programme)	Defence Simulation and Modelling
R-SEDC-HCSE	Human Centric Systems Engineering	Systems Engineering for Defence Capability	Defence Acquisition Management
R-SEDC-DAMS	Decision Analysis Modelling and Support	Systems Engineering for Defence Capability	Defence Acquisition Management
R-DAM-IDDA	The International Dimensions of Defence Acquisition	Defence Acquisition Management	Systems Engineering for Defence Capability
R-DAM-MKIDA	Knowledge in Defence	Defence Acquisition Management	Systems Engineering for Defence Capability
R-DAM-PPM	Programme and Project Management	Defence Acquisition Management	Systems Engineering for Defence Capability
R-DAM-SNMCE	Supply Network Management in Defence and the Commercial Environment	Defence Acquisition Management	Systems Engineering for Defence Capability

7. How are the ILOs assessed?

The course uses a range of assessment methods. Students can expect to have:

- assessed coursework
- three elements of assessment by Group presentation and Group Portfolio (during Applied Systems Thinking, Systems Engineering Workshop and Advanced Systems Engineering Workshop).

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

Assessment and ILO Mapping

A. Postgraduate Certificate

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

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

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Award ILOs / Module No.	ILO 10	ILO 11	ILO 12	ILO 13	ILO 14	ILO 15	ILO 16	ILO 17	ILO 18	ILO 19	ILO 20	ILO 21
9	ICW	ICW			ICW	ICW	ICW		ICW	ICW		
10	ICW		ICW	ICW				ICW	ICW	ICW		ICW
11	ICW	ICW					ICW			ICW		
12	ICW	ICW			ICW	ICW	ICW				ICW	
13	ICW	ICW			ICW	ICW				ICW		
14			ICW				ICW		ICW			
15	ICW		ICW							ICW		
16					ICW				ICW			
17					MULTI				MULTI			
18		ICW		ICW	ICW		ICW					
19			ICW				ICW	ICW				

C. Master of Science

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

Award ILOs / Module No.	ILO 22	ILO 23	ILO 24	ILO 25	ILO 26				
7	ICW GPRES		ICW	ICW					
9	ICW	ICW							
10									
15	ICW								
21	DISS	DISS	DISS	DISS	DISS				

<u>**CROSS-MODULAR ASSESSMENT**</u> (including any assessment which rests outside an individual module)

Title	Modules Covered	Assessment	
		Type	Weight (%)

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

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for

Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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

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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?**

Invariably, industrial and overseas students are sponsored on the course by their employer. The main reason for the sponsor providing this support is to ensure that their employees are equipped to undertake senior positions in the companies within procurement teams or through-life capability projects.

The UK MOD has initiated a more formal career management process through which staff will be identified and developed into identified Systems Engineering roles. The PgCert, PgDip and MSc, along with other courses run by the Centre for Systems Engineering, at Shrivenham, are part of this process.

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: Technology Innovation and Management for a Circular Economy

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Date of first publication/latest revision: 25/5/17

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1. What is the course?

Course information

Course Title	Technology Innovation and Management for a Circular Economy
Course code	MSTIMPTC, PDTIMPTC, PCTIMPTC
Academic Year	2017/18
Valid entry routes	MSc, PgDip, PgCert
Additional Exit Routes	PgDip, PgCert
Mode of delivery	Part time- Distance Learning and Face to Face
Location(s)[1] of Study	Cranfield
School(s)	SWEE
Theme	Water
Centre	Centre for Competitive Creative Design
Course Director	Dr Fiona Charnley
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Upper 2nd class UK Honours degree and/or relevant industrial experience. An IELTS score of 6.5 is required for students whose first language is not English.
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	Not Applicable

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[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	3 years part time
Course Start Month(s)	April and October (2 intakes per year)

Institutions delivering the course

This course is delivered by The School of Water, Energy and Environment where the research interests include:

- The development of technology and solutions to accelerate the transition towards a more sustainable, prosperous and resilient future.

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

- Ellen MacArthur Foundation will support the development and delivery of content.

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, but will be seeking accreditation from various bodies to reflect its multi-disciplinary nature such as CIWEM, CIWM etc.

2. What are the aims of the course?

This course aims to provide industrial professionals with technological knowledge, system-level understanding and personal competency to enable the design, implementation and management of innovative solutions, within the organisation in which they work or have influence over, for a circular economy.

The course is intended for professionals in full time employment from a range of backgrounds and industrial sectors with an interest in furthering their career in the area of a Circular Economy.

Included within this are learners who:

- have a responsibility for implementing a circular economy agenda across multiple departments within their organisations;
- have a responsibility for implementing a circular economy agenda across a specific department within their organisations;
- have a responsibility for implementing a sustainability strategy within their organisation,
- have an interest in understanding how the Circular Economy can enable responsible growth and opportunity within their organisation;
- are developing their own business within the field of a Circular Economy;
- are interested in exploring the career prospects and entrepreneurial / business led opportunities associated with a Circular economy.

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 analyse the key principles, benefits, challenges and underlying philosophy associated with a circular economy model and evaluate the economic, environmental, social and organisational impact of implementing aspects of the circular economy within your own business and across industrial sectors.

ILO 2.   Design and create novel solutions of circular activity, within a business context and wider ecosystem, and construct a comprehensive business case and implementation strategy for application. Systematically appraise methods by which the transition towards a circular economy can be effectively managed and reflect on your role as a change maker within that process.

B. Postgraduate Diploma

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

ILO 3.   Integrate knowledge, understanding and skills from the taught modules in a real-life situation.

ILO 4.   Effectively work in a small project team to identify project objectives and select appropriate methodologies to address problems faced by industrial clients, collaborating with other team members to communicate findings in a professional manner in written, oral and visual forms.

C. MSc

In 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, and evaluate findings and draw appropriate conclusions.

ILO 6.
   To communicate their findings successfully via a thesis, written in an approved School style and in an oral presentation.

4. How is the course taught?

The course will implement several novel methods of delivery and assessment to support students in their learning and personal development. These will include:

- The use of interactive technology enhanced delivery of materials through video, podcast, webinar and live interviews with industrial and academic experts;
- Facilitation of online group work, discussion and peer-peer feedback;
- Use of video and podcast for learners to reflect on their progress, synthesise material and for formative assessment and feedback;
- Summative assessment through continuous development of an e-portfolio which the learner can develop as part of the course and also take with them on completion of the course to support lifelong learning;
- A learning strand that is dedicated to supporting the personal capability and skill development of learners to ensure that up to graduating they are equipped with the necessary skills to implement approaches for a circular economy.

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
Understand and Analyse the Circular Economy	40
Innovate, Evaluate and Manage the Circular Economy	40
ELECTIVE MODULES:	
N/A	N/A
TOTAL:	80

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
Understand and Analyse the Circular Economy	40
Innovate, Evaluate and Manage the Circular Economy	40
Group Project	40
ELECTIVE MODULES:	
N/A	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:	
Induction Module	0
Understand and Analyse the Circular Economy	40
Innovate, Evaluate and Manage the Circular Economy	40
Group Project	40
Individual Research Project	80

ELECTIVE MODULES:	
N/A	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%.
All assessments need to be completed and the pass mark attained: no more than one failure to complete an assessment will be permitted throughout the course of your studies.

The taught element is made up of two substantial pieces of assessment:
- *A mark of ≥50% is required to pass each assessment.*
- *Failure to achieve the pass mark at the first attempt will normally result in a second assessment opportunity, capped at 50%.*

Group Project (equivalent to a substantial piece of assessment):
- *A mark of ≥50% is required to pass the assessment.*
- *Failure to achieve the pass mark at the first attempt will normally result in a second assessment opportunity, capped at 50%.*

Thesis:
- *The Individual Research Project needs to be passed with a mark of ≥50%.*
- *Failure to achieve the pass mark will normally result in either an outright fail or an opportunity to revise and represent the thesis, capped at 50%.*

6. **How is the course structured?**

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

The course is delivered through ten inter-linked learning strands which will be scheduled during the first year of the course contributing to module one and two. The learners will also undertake a multi-disciplinary group project and an individual thesis.

Course modules

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[5] - 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 module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]		Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
	I-TIM-INWK	Induction Week	Dr Raffaella Villa/ Dr Fiona Charnley	50		0	N	02/10/17	N/A	N/A	AO	N/A	N/A	N/A	N/A	N/A		N/A	
1	I-TIM-UAC	Understand and Analyse the Circular Economy	Dr Fiona Charnley	145		40	N	09/10/17	N/A	N/A	50	ICW	100					30/03/18	
2	I-TIM-IEC	Innovate, Evaluate and	Dr Raffaella Villa	135		40	N	02/04/18	N/A	N/A	50	ICW	100					28/09/18	

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

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

Technology, Innovation and Management for a Circular Economy COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 August 2017   Course / SAS Version:

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
									Calendar			Independent Assessment		Multi-part Assessment			Submission dates	
		Manage the Circular Economy																
3	I-TIM-GRPP	Group Project	Dr Adriana Encinas-Oropesa	16	0	40	N	01/10/18	N/A	N/A	50	GPROJ ICW	80 20				31/01/19	
4	I-TIM-THESIS	Individual Research Project	Dr Mariale Moreno	20	20	80	N	01/02/19	N/A	N/A	50	THESIS OR	90 10				30/09/19	

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

Technology, Innovation and Management for a Circular Economy 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 share the module

7. How are the ILOs assessed?

The following assessment types are utilised:

1. Online e-Portfolio/Coursework Modules 1 and 2
2. Group Project
3. Thesis Project

This approach has been adopted because:

The assessment is required to match the inter-disciplinary nature of the course and field of a Circular Economy. Therefore an e-portfolio for each ILO will be used for formative assessment of the individual throughout the course and also to summative assess the taught component of the course. The group project is essential to enable cross-disciplinary and cross-sectoral learning and for the implementation of methods, models and techniques learned within the taught component of the course and to assess group work capabilities. The individual thesis will enable the synthesis of learning throughout the course and implementation and reflection within the context and sector of the individual learner through a scientific research. See accompanying documents for assessment strategy.

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
1	ICW1	
2		ICW2

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.	ILO3	ILO4

Technology, Innovation and Management for a Circular Economy COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 August 2017   Course / SAS Version:1.0

Award ILOs / Module No.	ILO3	ILO4
3	GPROJ (80% GPROJ + 20% ICW)	GPROJ (80% GPROJ + 20% 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.	ILO5	ILO6
4	IPROJ (90% THESIS + 10% OR)	IPROJ (90% THESIS + 10% 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.

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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 field of a Circular Economy is rapidly growing as demonstrated within the course concept and business case. Graduates completing the course will have technological knowledge, system-level understanding and personal competency to enable the design, evaluation and implementation of transformational solutions for the future. This will provide graduates with opportunities to progress within their own organisations, implementing and managing a Circular Economy strategy across or within departments. Graduates will be amongst the first in the world to have skills related to the implementation of a Circular Economy in a rapidly emerging field which will make them desirable to organisations across sectors who aim to develop and implement a Circular Economy strategy. Graduates will also be more informed of the opportunities for innovation and entrepreneurship and therefore have the skills and capabilities to initiate and / or grow their own Circular Economy focused business.

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 Thermal Power

Date of first publication/latest revision:	October 2017

1. What is the course?

Course information

Course Title	MSc and PgDip Thermal Power
	with options in:
	        Aerospace Propulsion
	        Gas Turbine Technology
	        Power, Propulsion and the Environment
	        Rotating Machinery Engineering and Management

Course code	MSTHPFTC, MSTPAFTC, PDTHPFTC, PDTPAFTC,
Academic Year	2017/18
Valid entry routes	MSc, PgDip
Additional exit routes	PgCert
Mode of delivery	Full-Time
Location(s)[1] of Study	Cranfield University
School(s)	School of Aerospace, Transport and Manufacturing
Theme	Aerospace
Centre	Centre for Propulsion Engineering
Course Director	Dr Theokis Nikolaidis (October) / Dr Devaiah Nalianda (March) Director of Thermal Power (March and October) - Professor Pericles Pilidis
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

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[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

UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	Not Applicable
Registration Period(s) available	One Year
Course Start Month(s)	October and March

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

- Gas Turbine Engineering
- Turbomachinery and Icing
- Computational Aerodynamics
- Combustor Design

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 Royal Aeronautical Society (RAeS) and Institution of Mechanical Engineers (IMechE) until October 2016. Re-accreditation has been applied for 2017-2022.

2. What are the aims of the course?

Cranfield University offers this course in order to:
- Provide the skills required for a challenging career in the field of propulsion and power.

This programme is intended for students with 1st or 2nd class honours degree in:
- A physics based science subject and a mathematics based subject or
- A physics based science subject and an engineering subject or their international equivalent.

An individual with an HNC/HND or equivalent with considerable industrial experience may also be considered.

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

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

A. Postgraduate Diploma

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

ILO 1. Understand the design, performance, operation and maintenance requirements of complex gas turbine engines, their components and associated equipment.

ILO 2. Demonstrate a working knowledge of gas turbine cycles and performance under steady state and transient conditions.

ILO 3. Critically assess the mechanical design and integrity of the major gas turbine components and identify methods of improving the mechanical integrity and safety of existing designs.

ILO 4.   Demonstrate a working knowledge of the aerodynamic design of turbomachinery cascades for both the compressors and turbines of gas turbine engines.
ILO 5.   Demonstrate an understanding of the principles of combustion chemistry, the combustion process as encountered in practice and the influence of fuel properties on combustion performance.
ILO 6.   Apply the basic concepts and theories of heat transfer and cooling technologies to the cooling of turbine blades.
ILO 7.   Effectively manage time to produce work to a required schedule. Present technical work in an acceptable written format.
ILO 8.   Appreciate the cost, management and social effects of engineering decisions.
ILO 9.   Work effectively either as an individual or as a member of a team to produce solutions to engineering problems.
ILO 10.   Employ appropriate methods to identify and solve engineering problems.
ILO 11.   Confidently make well-informed decisions on operational and economic aspects of gas turbine operation.
ILO 12.   Make effective and immediate contributions to the work of a prospective employer.
ILO 13.   Identify candidate materials for particular applications in gas turbine engines recognising their relative merits and limitations.
ILO 14.   Appreciate the function and design requirements of current and future gas turbine engine systems.
ILO 15.   Use appropriate computer based tools such as simulation software for the design and evaluation of gas turbine engines and their components.

B. MSc

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

ILO 16.   Plan and execute a personal program of work to demonstrate ability as an independent learner leading to the production of a substantial technical thesis.
ILO 17.   Demonstrate to an expert audience, a range of problem solving and communication skills such as making oral presentations, producing written technical papers and defending technical work.
ILO 18.   Demonstrate a critical awareness of current research and development in the field of gas turbine technology as applied to the following:
- Aerospace propulsion
- Gas turbine technology
- Rotating machinery engineering and management
- Power propulsion and environment

4. How is the course taught?

Students are supported in their learning and personal development by:

- Group based exercises, project work, presentations and interaction with external agencies; The engine systems symposium is organised entirely by the students and is a team activity involving the marketing of the symposium to external delegates and the raising of funds to cover its cost.
- Class room teaching.
- Supervisor support.

3

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

Description	Credits
COMPULSORY MODULES:	
Modules 1, 3, 4, 5, 7	60
ELECTIVE MODULES:	
Modules chosen from modules 2, 6, 8 -12 to the total value of at least 60 credits	60
TOTAL:	120

B. MSc Gas Turbine Technology Option
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, 2, 3, 4, 5, 6, 7	90
Individual Research Project (13)	100
ELECTIVE MODULES:	
Modules chosen from modules 8, 9, 10, 11, 12 to the total value of at least 10 credits	10
TOTAL:	200

4

C. Postgraduate Diploma Aerospace Propulsion Option

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

Description	Credits
COMPULSORY MODULES:	
Modules 1, 3, 4, 5 7	60
ELECTIVE MODULES:	
Modules chosen from modules 2, 6, 8, 9, 10, 12 to the total value of at least 60 credits	60
TOTAL:	120

D. MSc Aerospace Propulsion Option

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, 2, 3, 4, 5, 6, 7, 9	100
Individual Research Project (13)	100
ELECTIVE MODULES:	
Additional modules can be chosen from 8, 10, 11, 12	
TOTAL:	200

5

E. Postgraduate Diploma Power, Propulsion and the Environment Option

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

Description	Credits
COMPULSORY MODULES:	
Modules 1, 3, 4, 5, 7	60
ELECTIVE MODULES:	
Modules chosen from modules 2, 6, 8-12 to the total value of at least 60 credits	60
TOTAL:	120

F. MSc Power, Propulsion and the Environment Option

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, 2, 3, 4, 5, 7, 11	90
Individual Research Project (13)	100
ELECTIVE MODULES:	
Modules chosen from modules 6, 8, 9, 10, 12, to the total value of at least 10 credits	10
TOTAL:	200

6

G. Postgraduate Diploma Rotating Machinery, Engineering and Management Option

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

Description	Credits
COMPULSORY MODULES:	
Modules 1, 2, 3, 4, 5, 6, 7, 8, 10, 11	120
ELECTIVE MODULES:	
N/A	
TOTAL:	120

H. MSc Rotating Machinery, Engineering and Management Option

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, 2, 3, 4, 5, 6, 7, 11	100
Individual Research Project (13)	100
ELECTIVE MODULES:	
Additional modules can be chosen from 8, 9, 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; - this may require an extension of their registration and additional fees to allow attendance to the module along with the next cohort.

7

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 Masters' course in October or March and are expected to complete the course within twelve calendar months. All Thermal Power options are available for both entries.

The PgDip courses are full-time and are coincident with the MSc courses.

The mandatory modules are typically delivered and spread over the first term. Second term modules are generally delivered over a week each.

Project topics for the MSc course are allocated in the first week of term and work towards the project is undertaken through the academic year.

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[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%).

Thermal Power COURSE SPECIFICATION
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Course modules

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

October 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%	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	N-THP-C	Combustors	Dr Vishal Sethi	30	0	10	N	N/A	02/10/17	02/11/17	40	EX	100				12/01/18	At the next opportunity with March Cohort AYR16
2	N-THP-ES	Engine Systems	Dr Yiguang Li	40	0	20	N	N/A	19/10/17	21/03/17	40			100	ICW IPRES	70 30	12/03/18 05/04/17 & 06/04/2017	At the next opportunity with March Cohort AYR16

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[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

9

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	N-THP-GPSD	Gas Turbine Performance, Simulation and Diagnostics	Prof Pericles Pilidis	65	0	20	N		02/10/17	14/12/17	50	EX	100				09/01/18	At the next opportunity with March Cohort AYR16
4	N-THP-T	Turbomachinery	Dr David MacManus	40	0	15	N		16/10/17	06/12/17	40	EX	100				09/01/18	At the next opportunity with March Cohort AYR16
5	N-THP-BC	Blade Cooling	Dr David MacManus	10	10	5	N		2/04/18	29/03/18	40	EX	100				24/04/18	At the next opportunity with March Cohort AYR16
6	N-THP-MDT	Mechanical Design of Turbomachinery	Dr Panos Laskaridis	30		10	N		09/10/17	12/12/17	40	EX	100				11/01/18	At the next opportunity with March Cohort AYR16
7	G-MTI Occ B16	Management for Technology	Stephen Carver	46		10	Y		15/01/18	19/01/18	40 40	EX GCW	50 50				19/03/18 23/01/18	At the next opportunity - possibly March 2018
8	N-THP-CFDGT	Computational Fluid Dynamics for Gas Turbines	Dr Joao Amaral Teixeira	30	N	10	N		22/01/18	27/01/18	40	ICW	100				23/02/18	At the next opportunity with March Cohort AYR16

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
9	N-THP-PSPI	Propulsion Systems Performance and Integration	Dr Devaiah Nalianda	30	4	10	N		27/02/17	06/03/17	40	EX	100				24/04/18	At the next opportunity with March Cohort AYR16
10	N-THP-FF	Fatigue and Fracture	Dr Panos Laskaridis	25	7	10	N		20/02/17	24/02/17	40	EX	100				26/04/18	At the next opportunity with March Cohort AYR16
11	N-THP-GTORM	Gas Turbine Operations and Rotating Machines	Dr Dr Uyioghosa Igie	30	22	10	N		13/02/17	17/02/17	40	ICW	100				12/04/18	At the next opportunity with March Cohort AYR16
12	N-THP-JEC	Jet Engine Control	Dr Theoklis Nikolaidis	30	N	10	N		13/03/17	17/03/17	40	EX	100				27/04/18	At the next opportunity with March Cohort AYR16
13	N-THP-THES/F	Individual Research Project	Prof Pericles Pilidis	30		100	N		07/10/17	16/08/17				100	THESIS OR	90 10	15/08/18 04/09/18	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

Thermal Power COURSE SPECIFICATION
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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	Calendar			Minimum Mark[14] - 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 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	N-THP-C Occ B	Combustors	Dr Vishal Sethi	30	0	10	N		12/03/18	01/05/18	40	EX	100				15/06/18	At the next available opportunity which will be approximately six months later
2	N-THP-ES Occ B	Engine Systems	Dr Yiguang Li	40	0	20	N		22/03/18	31/08/16	40			100	ICW IPRES	70 30	15/09/18 23/09/18	At the next available opportunity which will be approximately six months later

[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	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			**Assessment**						
												Independent Assessment		**Multi-part Assessment**			**Submission dates**	
3	N-THP-GPSD OccB	Gas Turbine Performance, Simulation and Diagnostics	Prof Pericles Pilidis	65	0	20	N	N/A	07/03/18	04/05/18	50	EX	100				05/06/18	At the next available opportunity which will be approximately 6 months later
4	N-THP-T Occ B	Turbomachinery	Dr David MacManus	40	0	15	N		12/03/18	21/05/18	40	EX	100				12/06/18	At the next available opportunity which will be approximately six months later
5	N-THP-BC Occ B	Blade Cooling	Dr David MacManus	10	10	5	N		10/07/18	11/07/18	40	EX	100				10/09/18	At the next available opportunity which will be approximately six months later
6	N-THP-MDT Occ B	Mechanical Design of Turbomachinery	Dr Panos Laskaridis	30		10	N		06/03/18	24/04/18	40	EX	100				13/06/18	At the next available opportunity which will be approximately six months later
7	G-MTI	Management for	Stephen	46	0	10	Y		14/01/19	18/01/19	40	EX	50				21/01/19	At the next available

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 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	Carver								40	GCW	50				18/01/19	opportunity which will be approximately 12 months later
8	N-THP-CFDGT Occ B	Computational Fluid Dynamics for Gas Turbines	Dr Joao Amaral Teixeira	30	14	10	N		18/06/18	22/06/18	40	ICW	100				22/08/18	At the next available opportunity which will be approximately six months later
9	N-THP-PSPI Occ B	Propulsion System Performance and Integration	Dr Devaiah Nalianda	30	4	10	N		30/07/18	06/08/18	40	EX	100				11/09/18	At the next available opportunity which will be approximately six months later
10	N-THP-FF Occ B	Fatigue and Fracture	Dr Panos Laskaridis	25	7	10	N		16/07/18	20/07/18	40	EX	100				13/09/18	At the next available opportunity which will be approximately six months later
11	N-THP-GTORM Occ B	Gas Turbine Operations and Rotating Machines	Dr Uyioghosa Igie	30	22	10	N		28/06/18	06/07/18	40	ICW	100				31/07/18	At the next available opportunity which will be

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 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
																		approximately six months later
12	N-THP-JEC Occ B	Jet Engine Control	Dr Theoklis Nikolaidis	30	13	10	N		06/08/18	10/08/18	40	EX	100				14/09/18	At the next available opportunity which will be approximately six months later
13	N-THP-THES/F Occ B	Individual Research Project	Prof Pericles Pilidis	30		100	N		07/03/19	08/01/19	50			100	THESIS OR	90 10	09/01/19 05/02/19	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

Module Type for Thermal Power Award Options

Module Number	Module Code	Aerospace Propulsion	Gas Turbine Technology	Power Propulsion and the Environment	Rotating Machine, Engineering and Management		Joint with another MSc
1	N-THP-C	C	C	C	C		
2	N-THP-ES	C (E for PgDip)	C (E for PgDip)	C (E for PgDip)	C		
3	N-THP-GPSD	C	C	C	C		
4	N-THP-T	C	C	C	C		
5	N-THP-BC	C	C	C	C		
6	N-THP-MDT	C (E for PgDip)	C (E for PgDip))	E	C		
7	G-MTI	C	C	C	C		
8	N-THP-CFDGT	E	E	E	C - PgDip only		
9	N-THP-PSPI	C (E for PgDip)	E	E			
10	N-THP-FF	E	E	E	C - PgDip only		
11	N-THP-GTORM	E	E	C (E for PgDip)	C		
12	N-THP-JEC	E	E	E			
13	N-THP-THES/F	C – MSc only	C – MSc only	C – MSc only	C – MSc only		

C - Compulsory; E – Elective;

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
G-MTI	Management for Technology	School of Management	• Computational and Software Techniques in Engineering • Thermal Power • Food Chain Systems • REMS EngD • SWEE Energy Programme

7. How are the ILOs assessed?

The course uses a range of assessment strategies. Students can expect to have up to eight written examinations, four assessments by submitted assignment work and at least two elements of assessment by presentation or viva. This approach has been adopted to enable students to learn via both formative and summative assessment strategies while simultaneously equipping them with transferrable skills.

Assessment and ILO Mapping

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

A. Postgraduate Diploma

Award ILOs / Module No.	ILO1	ILO2	ILO3	ILO4	ILO5	ILO6	ILO7	ILO8	ILO9	ILO10	ILO11	ILO12	ILO13	ILO14	ILO15
1	EX				EX		EX	EX	EX			EX			
2													ICW		
3	EX	EX							EX	EX		EX			EX
4	EX		EX	EX					EX	EX		EX			
5	EX		EX			EX			EX	EX		EX	EX		
6	EX		EX						EX	EX	EX	EX			
7							GCW	GCW	GCW		GCW	GCW			
8				ICW			ICW		ICW	ICW		ICW			ICW
9	EX								EX	EX		EX		EX	
10	EX		EX						EX	EX	EX	EX	EX		
11							ICW	ICW	ICW	ICW	ICW	ICW		ICW	
12	EX								EX	EX		EX	EX		

B. MSc

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

Award ILOs / Module No.	ILO16	ILO 17	ILO 18
2		IPRES	
13	THESIS	OR	THESIS OR

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

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

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

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

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

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

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

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

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

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?**

Over 90% of the graduates of the course have found employment within the 12 months of completing course. Most of the graduates are employed in the following industries/capacities:

- Gas turbine engine manufacturers
- Airframe manufacturers
- Airline operators
- Regulatory bodies
- Aerospace/Energy consultancies
- Power production industries
- Academia: doctoral studies
- Marine Propulsion
- Gas Turbines for Oil and Gas Application

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 Through-life System Sustainment

Date of first publication/latest revision: October 2017

1. What is the course?

Course information

Course Title	MSc in Through-life System Sustainment
Course code	MSTLSPTC, PDTLSPTC, PCTLSPTC
Academic Year	2017/18
Valid entry routes	MSc
Additional exit routes	PgDip, PgCert
Mode of delivery	Part-time
Location(s)[1] of Study	Cranfield Campus and Shrivenham Site
School(s)	School of Aerospace, Transport and Manufacturing
Theme	Manufacturing
Centre	Through-life Engineering Services Institute- EPSRC
Course Director	Dr John Erkoyuncu
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	N/A
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Part-time MSc - up to three years
Course Start Month(s)	Throughout the year

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[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 is delivered by the School of Aerospace, Transport and Manufacturing, Manufacturing Theme, Through-life Engineering Services Institute – EPSRC where the research interests include product-service and maintenance systems, and teaching interests include "through-life capability management".

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

Teaching will also be provided by external speakers, mostly leading industry practitioners, but may also include invited lectures from other institutions and other Schools within Cranfield University – this is likely, at least initially to be limited to University of Cambridge in the areas of information management (for asset management) and service solution design.

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 Institution of Engineering and Technology (IET), Institution of Mechanical Engineers (IMechE) and Royal Aeronautical Society until 2015/16.

2. What are the aims of the course?

Cranfield University offers this course in order to:

- Establish a leading position in the field of technical product sustainment systems / engineering system support and maintenance management education.
- Establish a route to transfer emerging research into practice.
- Build a cadre of alumni with an interest and capability in system support and maintenance management to support future research programmes.

PgDip and PgCert exit routes are also intended for students who wish to access only parts of the course provided.

This programme is intended for the following range of students:

- Post-experience Science/ Technology/ Engineering/Mathematics (STEM) graduates sponsored by their employer. It may be expected that students will participate as part of a wider leadership development programme.

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

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

A. **Postgraduate Certificate**

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

ILO 1.	Demonstrate understanding of the concepts of long-life equipment support and sustainment service.
ILO 2.	Critically analyse specific through-life support solutions.
ILO 3.	Critically evaluate factors affecting a long-life system availability and effectiveness.
ILO 4.	Demonstrate understanding of latest diagnostics and prognostics techniques and practices.
ILO 5.	Demonstrate understanding of challenges in large scale data management and analysis.

ILO 6.   Develop and critically evaluate system support supply network models.
ILO 7.   Demonstrate understanding of cost drivers and whole life cost modelling.
ILO 8.   Demonstrate understanding of the leadership roles and change management.

B. Postgraduate Diploma

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:
ILO 9.   Demonstrate key management and personal development skills needed to influence and implement change.
ILO 10. Demonstrate time and project management skills.
ILO 11. Demonstrate team based project skills to develop through-life system sustainment solutions (Group project for MSc and PgDip only).

C. MSc

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:
ILO 12. Critically evaluate the theory behind, and the selection of, appropriate analysis and design tools and apply them to develop new technical and business system sustainment solutions.
ILO 13. Undertake independent research on a subject relevant to through-life system sustainment involving project planning, development of new skills, critical evaluation of literature, evaluation of results, and discussion of findings and writing a thesis.

4. How is the course taught?

The course is taught through:
* An unassessed introductory/contextual induction.
* 8 taught modules (6 will be required for the PgCert).
* Industry experience days (with sponsoring companies).
* A multi-sector Group Project – supervised by Cranfield Academics.
* An Individual Project – supervised by Cranfield Academics.

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

* Individual coaching/mentoring.
* Online learning platform.

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

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

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

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

Description	Credits
COMPULSORY MODULES:	
Induction	0
Module 2	10
Any 5 Taught Modules from Modules 3-9	50
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:	
Induction	0
Modules 2-9	80
Group Project	40
ELECTIVE MODULES:	
None	
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
Modules 2-9	80
Group Project	40
Individual Research Project	80
ELECTIVE MODULES:	
None	
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;

Through-Life System Sustainment COURSE SPECIFICATION
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- 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>

The course is offered only on a part-time basis and will normally run over 2 years. Students will be permitted to undertake the course over upto 5 years if necessary due to employer commitments.

Modules will generally be delivered during intensive weeks. Group and Individual Projects will be undertaken mostly off site (at the industrial sponsors' facilities) on a part time basis over a period of 6 and 8 months respectively.

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[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%).

Through-Life System Sustainment COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 July 2017   Course / SAS Version:1.6

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' - 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-TLS-INWK	Induction	Dr John Erkoyuncu	24		0	N		17/10/17	19/10/17	N/A	AO	N/A				N/A	
2	I-TLS-A1524	Managing Assets and Value	Prof Rajkumar Roy	32		10	N		27/11/17	01/12/17	40	ICW	100				08/01/18	At the next available opportunity which may not be until the course runs the following year

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[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
3	I-TLS-A1525	System Effectiveness	Laura Lacey	32		10	N		22/01/18	26/01/18	40	ICW	100				05/03/18	At the next available opportunity which may not be until the course runs the following year
4	I-TLS-LSS	Leadership and Change Management	Dr Colin Pilbeam	32		10	N		16/04/18	20/04/18	40	ICW	100				01/06/18	At the next available opportunity which may not be until the course runs the following year
5	I-TLS-CENG	Optimising Whole Life Cost and Performance Management	Prof Rajkumar Roy	32		10	N		03/09/18	07/09/18	40	EX	100				21/01/19	At the next available opportunity which may not be until the course runs the following year
6	I-TLS-SNAM	Operational Availability and Risk	Petros Boutselis	32		10	N		26/11/2018	30/11/2018	40	ICW	100				22/01/19	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 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	
7	I-TLS-ETLS	Through-Life Business Models and Requirements Management	Jeremy Smith	32		10	N		21/01/19	25/01/19	40	ICW	100				11/03/19	At the next available opportunity which may not be until the course runs the following year
8	I-CE-A2012	Information Management	Dr Christos Emmanouilidis	32		10	N		01/04/19	05/04/19	40	EX	100				15/07/19	At the next available opportunity which may not be until the course runs the following year
9	I-IVH-A1514	Diagnostics and Prognostics	Dr Zakwan Skaf	32		10	N		10/06/19	14/06/19	40	ICW	100				01/09/19	At the next available opportunity which may not be until the course runs the following year
10	I-TLS-GP	Group Project	Dr John Erkoyuncu	20		40	N		02/03/18	03/09/18				MULTI 80 MULTI 20	GCW GPRES ICW IPRAC	64 16 10 10	03/09/18	At the next available opportunity which may not be until the course runs the following year
11	I-TLS-THESIS	Individual Research Project	Dr John Erkoyuncu	20		80	N		02/03/19	02/09/19		THESIS OR	90 10				02/09/19	

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
N/A	N/A	N/A	N/A

7. How are the ILOs assessed?

The following assessment types are utilised:

- 2 written examinations
- 6 assignments
- Assessment of the Group Project Report
- Assessment of the Individual Project Thesis

The methods are proposed based on recent experience with similar courses. The assessment will follow the School standard practices.

This approach has been adopted because:

> The course is heavily applied with the content that is presented and the large number of assignments allows the course to further give the opportunity for students to put in practice the learning from the modules.

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								
2	ICW	ICW	ICW				ICW	
3	ICW	ICW	ICW					
4								ICW
5	EX	EX					EX	
6	ICW	ICW	ICW			ICW		ICW
7	ICW	ICW	ICW					
8	EX	EX	EX		EX	EX		
9	ICW			ICW				

B. Postgraduate Diploma

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

Award ILOs / Module No.	ILO 9	ILO 10	ILO 11
10	GCW GPRES ICW IPRAC	GCW GPRES ICW IPRAC	GCW GPRES ICW IPRAC

C. MSc

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

Award ILOs / Module No.	ILO 12	ILO 13
11	THESIS ORAL	THESIS ORAL

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

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

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

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

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

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

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

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

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

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

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

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

In terms of the likely career paths and employability of graduates completing the course, please refer to section 2. Students are sponsored by a current employer and are generally seeking a change in role that brings higher levels of formal responsibility, a broadening of existing skills and capabilities and a greater level of professionalism.

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 Vehicle and Weapon Engineering USA (Defence Engineering Programme)

Date of first publication/latest revision:	28/05/16

1. What is the course?

Course information

Course Title	MSc Vehicle and Weapon Engineering USA (Defence Engineering Programme
Course code	MSVWEPTR, PDVWEPTR, PCVWEPTR, SPVWEPTR
Academic Year	2017/18
Valid entry routes	MSc, PgDip, PgCert
Exit routes	PgDip, PgCert
Mode of delivery	Part-time
Location(s)[1] of Study	Detroit, USA
School(s)	Cranfield Defence and Security
Theme	Defence and Security
Centre	Centre for Defence Engineering
Course Director	Prof Amer Hameed
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	N/A

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[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

Statement(s)	
Registration Period(s) available	Maximum of 5 years for MSc, 4 years for PgDip and 3 years for PgCert
Course Start Month(s)	The nature of the programme is such that prospective students can join the course at any time; however for administrative purposes it is preferred that students join the course in June.

Institutions delivering the course

This course is delivered by the Centre for Defence Engineering (CDE) in CDS where the research interests include various aspects of weapon and veicle systems such as mobility, lethality, survivability and systems integration. CDE is already delivering a similar suite of courses in Shrivenham to both UK Ministry of Defence (MOD) and members of Allied countries/forces. In addition, due to their expertise, CDE has provided consultancies to various government departments in the above areas.

The Defence Engineering programme (MS in Vehicle & Weapon Engineering) will be delivered on a part-time basis in Detroit in a flexible manner. The majority of the teaching and/or assessment will be provided by the CDE while two modules will be supported and delivered by the Centre for Systems Engineering (CSE). It's a CDS, Cranfield University initiative and the programme has no partners or collaborators.

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is not accredited by any external bodies.*

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

Cranfield University offers this course in order to:

- provide education and training at postgraduate level for military officers, defence industry staff and government servants who may expect to fill technically demanding appointments concerned with the design, development, procurement and operation of weapon systems
- provide graduates with the technical qualities, transferable skills and independent learning ability necessary to make them effective in organisations that design, develop, procure or operate military vehicles and gun systems.

The syllabus is designed to deliver the aim in a flexible manner over not more than 5 years as a part-time course. Taught modules are offered that provide balanced coverage of the main design aspects of weapon and vehicle systems, with an option to select either weapon or vehicle as a speciality.

The course has significant theoretical content and students are expected to develop skills in independent learning in order to process the quantity of taught material effectively. A group design study in the AFVWSS module is used to build team-working skills and explore the integration and trade-offs required in the design and development of vehicle and weapon systems. Group study is also designed to understand the user requirements and learn to apply a systems engineering approach in optimising the design. Attendees will be required to present their design to a critical audience and defend their design judgement and decisions.

An individual or group project presents the students with the opportunity to gain in-depth knowledge of a particular area of automotive or weapon engineering.

This programme is intended for the following range of students:

- Test and evaluation engineers, design and development engineers, manufacturing and industrial engineers, specification engineers, physicists and mathematicians working in the weapon and vehicle design, researchers and analysts working in the design and development of fighting vehicles
- Military personnel, government civil servants, defence industry, acquisition and procurement staff from DoD
- Graduates, who intend to take up a career in defence technology (DoD and industry)

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

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

A. Postgraduate Certificate in Vehicle and Weapon Engineering

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

ILO 1.   Demonstrate a systematic understanding of military vehicles and weapon systems technology including their systems engineering.

ILO 2.   Critically assess the design and integration of vehicle and cannon systems in the face of conflicting and limited information.

ILO 3.   Develop the modelling and simulation of weapon and vehicle components and systems using computer-based techniques; for example: ballistics, recoil, weapon control, ride, performance and handling.

ILO 4.   Critically analyse and evaluate the impact of new gun and vehicle technology on changes and developments in and to the threat.

ILO 5.   Apply the management and systems engineering techniques used in the integration of weapons and vehicles systems.

B. Postgraduate Diploma in Vehicle and Weapon Engineering

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

ILO 6.   Explain the engineering and physical limitations to the performance of weapon and vehicle systems in relation to their design.

ILO 7.   Critically analyse and evaluate the impact of new weapon and vehicle technology on changes and developments in and to the threat

ILO 8.   Illustrate the management and systems engineering techniques used in the integration of weapon and vehicles systems

ILO 9.   Defend the critical requirements of weapon and vehicle systems and be able to critically analyse the design specifications

C. MSc in Vehicle and Weapon Engineering

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

ILO 10.   Defend their design of Military Vehicle and Weapons systems

ILO 11.   Formulate a systematic approach and engineering judgement to the design and integration of vehicle and weapon systems in the face of conflicting and limited information

ILO 12.   Present and defend design solutions in an efficient manner

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ILO 13.   Generate the key requirements of weapon and vehicle systems and be able to critically analyse the design specifications

4. How is the course taught?

The programme will provide students with the technical knowledge and understanding of weapon systems and military vehicles to make them effective in specification, design, development and assessment. Special attention will be given to recent advances in defence technology, and to educating students in the analysis and evaluation of systems against changes and developments in the threat.

At the start of the course students will receive an induction programme covering administrative matters such as registration and being a CU student and academic related matters such as Study Skills, student support and use of the VLE via a videoed lecture.

The taught element of the programme will consist of 13 courses (modules) covering major aspects of defence technology, and providing a balanced and broad coverage of key aspects, critical issues and constraints associated with the design, development, performance and integration of weapon and vehicle systems.

The modular teaching programme culminates in an integrated Design Synthesis Course (Armoured Fighting Vehicle & Weapon Systems Study, AFVWSS). This draws together the material taught in the preceding courses and considers the design of the weapons and platform as a system, examining the compromises necessary to achieve optimum operational performance.

In addition to the teaching methods outlined above, students will be supported in their learning and personal development by undertaking computer based exercises specifically developed by the teaching team.

Linking theory to real examples adds credibility and builds confidence; therefore use of current and legacy equipment as a teaching aid to highlight design philosophy, design parameters and issues, constraints and trade-offs will be used as and when required.

To develop their confidence in conducting critical engineering analysis and systems evaluation, independent research and learning, students will undertake an AFVWSS design study.

Course tuition and project supervision will be undertaken as follows:

- The Centre for Defence Engineering (CDE) plans to visit Detroit three times a year in April, June and Nov/Dec for two weeks each visit to deliver two courses per visit and 5 days of project/design study supervision each year. This will allow delivery of 13 courses worth 120 credits, and project/design study worth 80 credits.
- During each visit, CDE will send a team of 3-6 academics and a module leader/course director to deliver the respective courses and supervision to the students.
- To ensure students are well prepared for courses, where required the course director will provide pre-reading material four weeks prior to the delivery of the course. Pre-reading material will be designed to provide background information necessary for the understanding of the critical design issues taught during the course. This pre-reading material is optional and will require no more than 2 -15 hours of private study.
- Each course will consist of lectures to develop better understanding in the students and will be supported by tutorials, (video) laboratory and computer based exercises to explain the application of engineering and applied science using real life examples.
- Depending upon the type of course, written examination and course work assessment will be undertaken. This element will require 40-45 hours of private study. If the course is assessed

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by course work, students will be given eight weeks after the delivery of the course to complete their work and submit the assessment.

- Unless discussed and agreed prior to the class, assessment by written examination will be undertaken on the last day of the course. Coursework feedback will be given to students in accordance with University regulations. Project/design study feedback will be given the week following each visit.

- During each visit, the project supervisor along with course director will organise one-to-one meetings with the students to discuss and monitor their progress. Design study/project supervisors will also provide guidance and direction to the student(s). Any concerns and achievements will be documented and appropriate action will be taken to ensure that students' concerns are satisfactorily addressed.

The Individual Project
Aim
The overall aim of the project is to enable an individual student to develop, by first-hand experience, his expertise in engineering research, design or development in the field of military vehicle technology.

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:	
Any combination of the PgDip modules with an accumulated credit of 60.	60
ELECTIVE MODULES:	
TOTAL:	**60**

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

Description	Credits
COMPULSORY MODULES:	
Module 1a or 1b	5
Module 2 a or 2b	5
Modules 3, 4, 6, 7, 8, 9, 11, 12, and 13	9 x 10
SPECIALISMS – CHOOSE EITHER VEHICLE OR WEAPONS SPECIALISM	

Vehicle	
Module 5a	10
Module 10a	10
Weapons	
Module 5b	10
Module 10b	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:	
Module 1a or 1b	5
Module 2a or 2b	5
Modules 3, 4, 6, 7, 8, 9, 11, 12, and 13	9 x 10
Projects	80
SPECIALISMS – CHOOSE EITHER VEHICLE OR WEAPONS SPECIALISM	
Vehicle	
Module 5a	10
Module 10a	10
Weapons	
Module 5b	10
Module 10b	10
TOTAL:	**200**

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

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

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

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee);[3] [4]

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[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).

- **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>

Please see the course structure document for details on the individual elements of the course. Overall, the programme is offered off-campus on a part-time basis only. The programme is divided into 2 main parts: the taught phase and the project/design study. Taught phase of the MSc course will be delivered over 4 years in Detroit. Two modules will be taught per visit with two to three visits per year. The project/design study will be integrated throughout the taught phase. The nature of the programme is such that prospective students can join the course at any time; however for administrative purposes it is preferred that students join the course in June.

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

Course modules

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

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar				Assessment						
								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
1a	R-VWE-FVD	Fighting Vehicle Design		40	1	5	N	05/11/18	26/11/18	30/11/18	40			100	ICW EX	50 50	28/02/19 30/11/18	30/05/19 22/03/19
								30/04/21	14/06/21	18/06/21	40			100	ICW EX	50 50	18/08/21 18/06/21	23/11/21 26/03/22
1b	R-VWE-FEDE	Finite Elements in Defence		35	N/A	5	N	04/03/19	18/03/19	22/03/19	40	ICW	100				23/05/19	23/08/19
								01/03/21	22/03/21	26/03/21	40	ICW	100				26/05/21	25/08/21

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[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

Vehicle and Weapon Engineering (USA) COURSE SPECIFICATION
QA&E USE ONLY: Version 4.1 September 2017

Course / SAS Version: [1.3 Aug17]

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
		Engineering																]
2a	R-VWE SEAP	Systems Engineering and Assured Performance		35	1	5	N	[25/03/18 05/11/20]	[09/04/18 23/11/20]	[13/04/18 27/11/20]	40 40			100 100	ICW EX ICW EX	70 30 70 30	[13/06/18 13/04/18 26/02/21 27/11/20]	[26/09/18 15/06/18 26/05/21 26/03/21]
2b	R-VWE-MSC DE	Modelling, Simulation and Control in Defence Engineering		35		5	N	[15/11/18 01/06/20]	[03/12/18 15/06/20]	[07/12/18 19/06/20]	40 40	ICW ICW	100 100				[28/02/19 19/08/20]	[28/05/19 19/11/20]
3	R-VWE-WST	Weapon Systems Technology		40	5	10	N	[11/11/19]	[02/12/19]	[06/12/19]	40			100	ICW EX	50 50	[06/03/20 06/12/19]	[06/05/20 28/03/20]
4	R-VWE-FB	Fundamentals of Ballistics		40	-	10	N	[04/11/19]	[25/11/19]	[29/11/19]	40			100	ICW EX	50 50	[02/03/20 29/11/19]	[06/05/20 28/03/20]
5a	R-VWE-MVP	Military Vehicle Propulsion		40	-	10	N	[28/05/19 18/10/21	[10/06/19 29/11/21]	[14/06/19 03/12/21]	40			100	ICW EX	50 50	[14/08/19 14/06/19 03/03/22	[28/11/19 06/12/19 03/06/22

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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
		(for vehicle speciality)									40			100	ICW EX	50 50	03/12/21	08/04/22
5b	R-VWE MVPD	Military Vehicle Propulsion and Dynamics (for weapon speciality)		40		10	N	28/05/19 18/10/21	10/06/19 29/11/21	14/06/19 03/12/21	40 40			100 100	ICW EX ICW EX	60 40 60 40	14/08/19 14/06/19 03/03/22 03/12/21	28/11/19 06/12/19 03/06/22 08/04/22
6	R-VWE EDT	Electric Drive Technologies		35	2	10	N	15/11/17 10/03/20	04/12/17 23/03/20	08/12/17 28/03/20	40 40			100 100	ICW EX ICW EX	50 50 50 50	08/03/18 08/12/17 28/05/20 28/03/20	07/06/18 13/04/18 28/08/20 27/11/20
7	R-VWE LWD	Light Weapon Design		36	3	10	N	08/03/19	25/03/19	29/03/19	40			100	ICW EX	50 50	29/05/19 29/03/19	27/09/19 14/06/19
8	R-VWE MAV	Military Autonomous Vehicle		35	3	10	N	08/11/17 10/03/20	27/11/17 30/03/20	01/12/17 03/04/20	40 40			100 100	ICW EX ICW EX	50 50 50 50	08/03/18 01/12/17 03/06/20 03/04/20	07/06/18 13/04/18 03/09/20 27/11/20

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

Module Number	Module code	Title	Module Leader	Contact hours[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
9	R-VWE-SURV	Survivability		40		10	N	[04/06/18 01/06/21 [	[18/06/18 21/06/21]	[22/06/18 25/06/21]	40 40			100 100	ICW EX ICW EX	50 50 50 50	[22/08/18 22/06/18 25/08/21 25/06/21]	[23/01/19 30/11/18 25/11/21 03/12/21]
10a	R-VWE MVD	Military Vehicle Dynamics (for Vehicle speciality)		40		10	N	[01/06/19 15/11/21]	[17/06/19 06/12/21]	[21/06/19 10/12/21]	40 40			100 100	ICW EX ICW EX	40 60 40 60	[21/08/19 21/06/19 10/03/22 10/12/21]	[21/11/19 29/11/19 10/06/22 01/04/22]
10b	R-VWE GSD	Gun Systems Design (for Weapon speciality)		40		10	N	[13/11/17 05/11/19]	[27/11/17 25/11/19]	[01/12/17 29/11/19]	40 40	ICW ICW	100 100			[19/02/18 19/03/20]	[06/05/18 06/05/20]
11	R-VWE-VSI	Vehicle Systems Integration		40		10	N	[25/05/18 05/5/20]	[18/06/18 22/06/20]	[22/06/18 26/06/20]	40 40			100 100	ICW EX ICW Ex	70 30 70 30	[22/08/18 22/06/18 26/08/20 26/06/20]	[23/11/18 30/11/18 23/11/20 27/11/20]
12	R-VWE-RSE	Reliability and System Effectiveness		36		10	N	[15/03/18	[09/04/18	[13/04/18	40			100	ICW EX	70 30	[13/06/18 13/04/18	[13/09/18 22/06/18

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

Vehicle and Weapon Engineering (USA) COURSE SPECIFICATION
QA&E USE ONLY: Version 4.1 September 2017

Course / SAS Version: [1.3 Aug17]

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
								09/11/20]	30/11/20]	04/12/20]	40			100	ICW EX	70 30	04/03/21 04/12/20]	04/06/21 19/03/21]
13	R-VWE-AFV WSS	Armoured Fighting Vehicle and Weapon Systems Study (2 weeks course)		55		10	N	28/05/18 01/03/21]	11/06/18 15/03/21]	22/06/18 26/03/21]	40 40	ICW ICW	100 100				22/08/18 26/05/21]	26/01/19 26/08/21]
14	R-VWE-DISS	Projects		100		80	N	[ ]	01/08/17 01/08/18 01/08/19 01/08/20]	31/07/18 31/07/19 31/07/20 31/07/21]	50 50	THESIS THESIS	100 100				End of registration]	[]

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
NIL			

7. How are the ILOs assessed?

The following assessment types are utilised:

The course uses a range of assessment types including written examination, coursework, thesis and oral examination.

This approach has been adopted to assess the intended learning outcomes and the weighting of assessment, particularly the use of written examinations addresses the educational expectation of the USA market.

Assessment and ILO Mapping

A. Postgraduate Certificate

Module No. / Award ILOs	ILO 1.	ILO2.	ILO3	ILO4	ILO5
1a	X	X		X	X
1b	X		X		
2a	X			X	X
2b	X	X	X	X	X
3	X	X	X	X	
4	X	X			
5a	X	X			
5b	X	X			
6	X			X	X
7	X			X	X
8	X		X	X	X
9	X			X	
10a	X	X		X	
10b	X	X		X	
11				X	X
12					
13	X	X	X	X	X

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Postgraduate Diploma

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

Award ILOs / Module No.	ILO6	ILO7	ILO8	ILO9	
1a					
1b	X				
2a	X				
2b					
3	X				
4	X	X			
5a	X	X	X	X	
5b	X	X	X	X	
6	X	X		X	
7	X	X	X	X	
8	X	X		X	
9	X	X	X	X	
10a	X	X	X	X	
10b	X	X	X	X	
11	X			X	
12	X	X	X	X	
13	X	X	X	X	

B. MSc

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

Award ILOs / Module No.	ILO10	ILO11	ILO12	ILO13	
1a		X	X		
1b		X	X		
2a		X	X		
2b		X	X		
3		X	X		
4		X	X		
5a			X		
5b			X		

15

Award ILOs / Module No.	ILO10	ILO11	ILO12	ILO13	
6			X		
7			X		
8			X		
9	X	X	X	X	
10a	X	X	X	X	
10b	X	X	X	X	
11				X	
12	X				
13	X	X	X	X	
14	X	X	X	X	

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.

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(External Examining) which emphasises that external examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

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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.

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

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

This programme is intended for the following range of students as part of their continuing professional development to improve their skills in their current role and to enhance career progression opportunities within their current organisations:

- Test and evaluation engineers, design and development engineers, manufacturing and industrial engineers, specification engineers, physicist and mathematicians working in the weapon and vehicle design, researchers and analysts working in the design and development of fighting vehicles
- Military personnel, government civil servants, defence industry, acquisition and procurement staff from DoD
- Graduates, who intend to take up a career in defence technology (DoD and industry)

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 Water and Wastewater Engineering

Date of first publication/latest revision:	26/01/16 – July 2017

1. What is the course?

Course information

Course Title	Water and Wastewater Engineering
Course code	MSWWEFTC, MSWWEPTC, PDWWEFTC, PDWWEPTC, PCWWEFTC, PCWWEPTC
Academic Year	201718
Valid entry routes	MSc, PgDip, PgCert
Exit routes	MSc, 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 Jitka MacAdam
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)

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[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)	October; PTs –any time

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. Water Science's activities encompass treatment technologies, engineering, irrigation, socioeconomics and policy where these relate to the improvement of water quality, and the protection and enhancement of the natural, human and industrial environments.

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

- Teaching and assessment is provided by an Engineering Consultant (Richard Hill, Whitewater Ltd). A number of lectures are delivered by representatives from UK water utilities, regulators and consultancies.

- Students undertake their research and/or project work off campus, or at another institution.

- Teaching is provided from utility companies, other external agencies, or jointly with other institutions.

- The course has defined feeder streams from other institutions, including significant sponsorships.

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is accredited formally by the Chartered Institution of Water and Environmental Management (CIWEM) until October 2021.

2. What are the aims of the course?

Cranfield University offers this course in order to:

- Develop suitably trained and qualified process engineers and design engineers in all aspects of water and wastewater treatment, enabling them to make a significant contribution to their future or current employee's performance and operation, with the potential to progress further into senior management positions.
- Deliver graduates whose acquired understanding of process engineering and design of treatment works will enable them to work within organisations involved in water treatment technology and process design for improving water quality to meet environmental and industrial standards (full-time students).
- Deliver graduates whose acquired understanding will enable them to develop their existing capability within organisations involved in water treatment technology and process design to improve water quality to meet environmental and industrial standards (part-time students).

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 an undergraduate degree with a strong science and engineering element keen to pursue careers within companies and organisations involved in water and wastewater treatment, including utilities, contractors, consultants, equipment manufacturers, suppliers and industrial water users.
- Graduates currently working in the water sector keen to extend their qualifications
- Individuals with other qualifications 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 Water and Wastewater Engineering**

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

ILO 1.   Identify the design principles, practice and operational experience of conventional and advanced treatment processes together with practical design considerations and calculate water & wastewater treatment flowsheets

ILO 2.   Select the appropriate scientific management and engineering strategies which promote environmental good practice and sustainable development in the water sector and which contribute to tackling new challenges.

ILO 3.   Systematically and critically apply scientific and engineering principles to the design, interconnection and sustainable operation of processes for water quality improvement in municipal, environmental and industrial water and wastewater treatment contexts.

B. **Postgraduate Diploma in Water and Wastewater Engineering**

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

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

C. MSc in Water and Wastewater Engineering

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

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

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

4. How is the course taught?

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

- Understanding is developed through the application of knowledge from the taught modules and laboratory practicals to deliver optimum solutions to specified process design briefs.
- The case study-based design brief is used to develop independent research and presentation skills that are later applied at an advanced level in the design and thesis project.
- Research and private study is necessary for the successful completion of design and thesis projects which also enhanced knowledge and individual study abilities.
- Formative feedback on assessed assignments enhances the learning process and informal feedback on non-assessed individual or group exercises are also used.
- Course Directors and Module Convenors are available for advice on course study and additional reading material.
- Academic staff are readily available for informal advice and feedback.
- Each student is allocated a thesis project supervisor to guide and direct the research.

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

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ELECTIVE MODULES:	
Any 6 of the following modules: Water and Wastewater Treatment Principles Process Science and Engineering Hydraulics and Pumping Systems Risk Management and Reliability Engineering Chemical Processes Physical Processes Biological Processes Water Reuse and Resource Recovery	10 10 10 10 10 10 10 10
TOTAL:	**60**

B. Postgraduate Diploma

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

Description	Credits
COMPULSORY MODULES:	
Induction	0
Water and Wastewater Treatment Principles Process Science and Engineering Hydraulics and Pumping Systems Risk Management and Reliability Engineering Chemical Processes Physical Processes Biological Processes Water Reuse and Resource Recovery	10 10 10 10 10 10 10 10
Potable/Wastewater Group Design Project (Full-time students)	40
ELECTIVE MODULES:	
Part Time Students: Potable/Wastewater Group Design Project (Full-time students) OR Potable/Wastewater Individual Design Project (Part-time students)	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
Water and Wastewater Treatment Principles	10
Process Science and Engineering	10
Hydraulics and Pumping Systems	10
Risk Management and Reliability Engineering	10
Chemical Processes	10
Physical Processes	10
Biological Processes	10
Water Reuse and Resource Recovery	10
Potable/Wastewater Group Design Project (Full-time students)	40
Thesis project	80
ELECTIVE MODULES:	
Part Time Students: Potable/Wastewater Group Design Project (Full-time students) OR	40
Potable/Wastewater Individual Design Project (Part-time students)	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);

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[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%).

- 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.

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. For part time students who join the course after the induction week module, a recording and presentations are made available.

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

There are two modules (Process Science and Engineering and Water Reuse & Resource Recovery) structured as 'flipped classroom' where the first week is spent on individual study of online materials and during the second week there are a number of activities/sessions organised including a fieldtrip (water reuse only) and various workshops and tutorials.

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	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
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-WSC-A1096	Water and Wastewater Treatment Principles	J MacAdam	30		10	Y		09/10/17	13/10/17	40	ICW	100				FT 21/10/17 PT 04/11/17	June 18
3	I-WSC-A1093	Process Science and	M Pidou	25		10	Y	23/10/17	30/10/17	03/11/17	40	EX	100				W/C 02/01/18	Sept 18

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[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
		Engineering																
4	I-WSC-A1507	Hydraulics and Pumping Systems	I Carra	27		10	Y		06/11/17	10/11/17	40	ICW	100				FT 18/11/17 PT 02/12/17	June 18
5	I-WSC-A1095	Risk Management and Reliability Engineering	J Macadam	30		10	Y		20/11/17	24/11/17	40			100	GCW ICW	70 30	FT/ PT 16/12/17	June 18
6	I-WSC-A1089	Chemical Processes	E Goslan	30		10	N		04/12/17	08/12/17	40	EX	100				W/C 02/01/18	Sept 18
7	I-WSC-A1092	Physical Processes	P Jarvis	30		10	N		08/01/18	12/01/18	40	EX	100				W/C 15/01/18	Sept 18
8	I-WSC-A1087	Biological Processes	A Soares	30		10	N		22/01/18	26/01/18	40	ICW	100				FT 03/02/18 PT 17/02/18	June 18

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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
9	I-WSC-WRRR	Water Reuse and Resource Recovery	H Smith	30		10	N	05/02/18	12/02/18	16/02/18	40	IPRES	100				FT/PT15/02/18	June 18
PROJECTS																		
10	I-WAT-GRPP	Group Project	Supervisors	16		40	Y		19/02/18	04/05/18	50	GPROJ ICW	80 20				01/05/18 05/05/18	
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	07/09/18	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

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

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
I-WSC-A1096	Water & Wastewater Treatment Principles	MSc in Water & Wastewater Engineering	• Module is delivered to students from STREAM.
I-WSC-A1093	Process Science & Engineering	MSc in Water & Wastewater Engineering	• Module is delivered to students from STREAM
I-WSC-A1095	Risk Management & Reliability Engineering	MSc in Water & Wastewater Engineering	• Module is delivered to students on courses in the Environment Programme (MSc in Environmental Engineering), and STREAM
I-WSC-A1507	Hydraulics and Pumping Systems	MSc in Water & Wastewater Engineering	• Module is delivered to students from STREAM

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 a maximum of 3 written examinations, a maximum of 8 pieces of assessment by submitted work and 3 elements of assessment by presentation or viva. 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) or examination;
- Group projects for FTs (20%) are assessed by means of a written group report and presentations. Individual design projects (PTs) are assessed by means of a written dissertation.
- The research project (40%) is assessed by a thesis and an oral examination.

This approach has been adopted because:

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

Assessment and ILO Mapping

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

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

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A. Postgraduate Certificate in Water and Wastewater Engineering

Award ILOs Module No.	ILO 1.	ILO 2.	ILO 3.
I-WSC-A1096	ICW		
I-WSC-A1093	EX		
I-WSC-A1507	ICW		
I-WSC-A1095		ICW GCW	
I-WSC-A1089		EX	EX
I-WSC-A1092		EX	EX
I-WSC-A1087		ICW	ICW
I-WSC-WRRR		IPRES	IPRES

B. Postgraduate Diploma in Water and Wastewater Engineering

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

Award ILOs Module No.	ILO 4.
I-WAT-GRPP	GPROJ ICW
I-WAT-DISS	IPROJ IPRES

C. MSc in Water and Wastewater Engineering

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

Award ILOs Module No.	ILO 5.	ILO 6
I-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.

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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 will leave the course well educated, skilled and experienced to operate and manage vital water and wastewater treatment services. The demand for such graduates is already high and will only increase over coming years as environmental standards for water quality increase, and pressures on our water supplies continue to grow. Graduates from the course are highly employable within companies and organisations involved in water and wastewater treatment, including utilities, contractors, consultants, equipment manufacturers, suppliers, regulators and industrial water users.

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: Weapon and Vehicle Systems Programme • Military Vehicle Technology (MVT) • Gun Systems Design (GSD)	

Date of first publication/latest revision: 24/3/17

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1. What is the course?

Course information

Course Title	Weapons and Vehicle Systems Programme [Military Vehicle Technology (MVT) and Gun Systems Design (GSD)]
Course code	MSMVTFTR–PDMVTFTR-PCMVTFTR MSMVTPTR–PDMVTPTR-PCMVTPTR MSGSDFTR–PDGSDFTR–PCGSDFTR MSGSDPTR–PDGSDPTR-PCGSTPTR
Academic Year	2017-18
Valid entry routes	MSc, PgDip, PgCert
Exit routes	MSc, PgDip, PgCert
Mode of delivery	Full time & Part time
Location(s)[1] of Study	Shrivenham
School(s)	Cranfield Defence and Security
Theme	N/A
Centre	Centre for Defence Engineering
Course Director	Mr Dave Simner
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Teaching Institution	Cranfield University
Admissions body	Cranfield University

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[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

Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Up to 1 year Full Time; Part Time: MSc 3 Years, PgDip and PgCert 2 Years,
Course Start Month(s)	September

Institutions delivering the course

This course is delivered by Centre for Defence Engineering at Cranfield Defence and Security, where the research interests include Vehicle Dynamics – Ride and Handling of Military Vehicles, Vehicle Protection, Vehicle Design – including the development of parametric modelling tools, hybrid military vehicles, modelling of threat mechanisms for vehicles, ground interaction of military vehicles – terramechanics, dynamics of tracked vehicles, integration of weapon systems on military vehicle, internal, external and terminal ballistics, gun design and survivability.

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

Teaching and assessment is also provided by the Department of Informatics and Systems Engineering at Cranfield Defence and Security.

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 currently accreditation but plans to seek accreditation with IET in 2017/18 and to renew Institute of Mechanical Engineers accreditation at the earliest opportunity.

2. What are the aims of the course?

Cranfield University offers this programme in order to:

- Provide graduates with the technical qualities, transferrable skills and independent learning ability necessary to make them effective in organisations that design, develop, procure or operate military vehicles and gun systems.
- Postgraduate Diploma and Postgraduate Certificate 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:

Engineers, Managers and Military Officers/Non-commissioned Officers working in
- Weapon systems design, development and procurement
- Military vehicle design, development and procurement
- Weapons and vehicle systems engineering and integration

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

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

Note GSD students will concentrate on Weapon subjects, while MVT students will concentrate on Vehicle topics.

A. Postgraduate Certificate in Military Vehicle Technology/Gun Systems Design

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

ILO 1. Demonstrate a comprehensive understanding of military vehicles and/or gun systems and be able to critically assess the mechanical design using appropriate methods;

ILO 2. Explain the engineering and physical limitations to the performance of gun or vehicle systems in relation to their design;

ILO 3. Apply the appropriate techniques and tools to analyse and evaluate mechanical system problems, propose solutions and implement them – demonstrating a systematic approach and the use of engineering judgement;

ILO 4. Demonstrate a practical and sound engineering approach to problem solving.

B. Postgraduate Diploma in Military Vehicle Technology/Gun Systems Design

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

ILO 5. Demonstrate knowledge of modelling and simulation of gun or vehicle components and systems using computer-based techniques: for example; ballistics, recoil, weapon control, vehicle ride, performance and handling;

ILO 6. Critically analyse and evaluate the impact of new gun or vehicle technology on changes and developments in, and to the threat;

ILO 7. Solve problems using a system approach, allowing the vehicle student to gain an understanding of the weapon system (and its impact on the vehicle), and the gun student to demonstrate an appreciation of vehicle design and therefore the implications for the integration of the weapon system onto a platform;

ILO 8. Demonstrate the ability to learn independently, work effectively under time pressure and present their results, proposals and conclusions in written and oral form;

ILO 9. Critically appraise technical and commercial literature and select appropriate technologies and methods to suit particular problems and projects;

ILO 10. Demonstrate the ability to critically assess their own technical performance and that of others.

C. MSc

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

ILO 11. Demonstrate self-direction and originality in developing and delivering successful independent research to include informed judgements regarding incomplete and/or fuzzy data, and then being able to define problems, propose suitable hypotheses and complete the appropriate analysis in order to draw the required conclusions.

4. How is the course taught?

Lectures, tutorials and practical exercises are used to develop the necessary knowledge. Formal feedback on assessed assignments enhances the learning process and informal feedback on non-assessed individual or group exercises is used.

Supervision is provided for projects, which provides guidance for the students taking the MSc. Students will be supported in their learning and personal development by:

The use of the 'Virtual Learning Environment' (VLE) where additional resources will be added to complement those used directly in the taught modules
The use of 'Research and Briefing' exercises where students study a topic while undertaking one of the modules and then presenting the topic back to the group
Discussion sessions regarding new technology and developments of current military equipment
Participation on the modules of serving Military Officers, who are able to raise current issues and comment on the latest developments

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

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

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

Note: The numbers used throughout the following tables can be found in the Course Module table that follow in Section 6

A. Postgraduate Certificate in Gun Systems Design

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

Description	Credits
COMPULSORY MODULES:	
Modules 5, 6	20
ELECTIVE MODULES	
Modules to make up 40 credits, excluding modules 7 or 10	40
TOTAL:	60

B. Postgraduate Diploma in Gun Systems Design

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

Description	Credits
COMPULSORY MODULES:	
Modules 1, 2	0
Modules 3, 4, 5, 6, 8, 11, 12, 15 and 19	90
Module 9	20
ELECTIVE MODULES	
Modules to make up 10 credits	10
TOTAL:	120

C. MSc in Gun System Design

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

Description	Credits
COMPULSORY MODULES:	
Modules 1, 2	0
Modules 3, 4, 5, 6, 8, 11, 12, 15 and 19	90
Module 9	20
Project	80
ELECTIVE MODULES	
Modules to make up 10 credits	10
TOTAL:	200

D.   Postgraduate Certificate in Military Vehicle Technology
The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Modules 7 or 10 Plus one of modules 11, 14, 15 or 16	20 10
ELECTIVE MODULES:	
Modules to make up 30 credits, excluding module 5	30
TOTAL:	60

E.   Postgraduate Diploma in Military Vehicle Technology
The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Modules 1, 2 Modules 3, 4, 6, 11,15 and 19 Module 7 and 10	0 60 40
ELECTIVE MODULES	
Modules to make up 20 credits	20
TOTAL:	**120**

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

Description	Credits
COMPULSORY MODULES:	
Modules 1, 2 Modules 3, 4, 6, 11, 15 and 19 Module 7 and 10 Project	0 60 40 80
ELECTIVE MODULES	
Modules to make up 20 credits	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>

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

Full-time students register for the MSc course in September and are expected to complete the course within a maximum of 13 months calendar months. PgCert and PgDip students will be shorter than this depending on module choice; typically 12-15 weeks for PgCert and 26 weeks for PgDip.

This course is also offered on a part-time basis. Students have up to 3 years (MSc) to complete the MSc, part-time PgDip and PgCert students have up to 2 years.

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[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
SEPTEMBER 2017 – ADMISSIONS DAY FOR THE COURSE – MONDAY 4TH																		
1	R-ESD-IS	Introductory Studies (IS)		30		0	N	[N/A]	[05/09/17]	[08/09/17]	N/A	AO	100				N/A]	[N/A]
2	R-ESD-CAD	Solid Modelling and CAD (CAD)		30		0	N	[N/A]	[11/09/17]	[15/09/17]	N/A	AO	100				N/A]	[N/A]
3	R-ESD-MSC	Modelling Simulation and Control(MSC)		35		10	N	[N/A]	[18/09/17]	[22/09/17]	40	ICW OR	70 30				02/10/17 FT 16/10/17 PT 30/11/17 PT]	[By individual arrangement]

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[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

Weapon and Vehicle Systems Programme COURSE SPECIFICATION

QA&E USE ONLY: Version 3.0 July

Course / SAS Version: [1.2 (3.2.17]

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
4	R-ESD-FE	Finite Elements in Engineering (FEE)		35	0	10	N	[N/A]	[25/09/17	[29/09/17	40	ICW	100				30/10/17 FT13/11/17 PT]	[By individual arrangement]
OCTOBER 2017: – PRIVATE STUDY WEEK 16-20 OCTOBER (NOTE THAT MONDAY 16TH OCTOBER MAY BE USED AS A PRESENTATION DAY FOR THE MSC MODULE.)																		
5	R-ESD-FB	Fundamentals of Ballistics (FoB)		33	0	10	N	[N/A]	[02/10/17	[06/10/17	40 40	ICW EX	35 65				20/11/17 FT 04/12/17 PT 11/12/17]	[By individual arrangement (Block 2)]
6	R-ESD-WST	Weapon Systems Technology (WST)		30	0	10	N	[N/A]	[09/10/17	[13/10/17	40	ICW	100				15/01/18 FT 12/2/18 PT]	[By individual arrangement]
7	R-ESD-MVD	Military Vehicle Dynamics(MVD)		70	0	20	N	[N/A]	[23/10/17	[03/11/17	40 40	ICW EX	50 50				22/01/18 FT 19/02/18 PT 14/12/17]	[By individual arrangement (Block 2)]
8	R-ESD-ED	Element Design (ED)		35	0	10	N	[N/A]	[23/10/17	[27/10/17	40	ICW	100				19/03/18FT 09/04/18 PT]	[By individual arrangement]

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

Weapon and Vehicle Systems Programme COURSE SPECIFICATION

QA&E USE ONLY: Version 3.0 July

Course / SAS Version:[1.2 (3.2.17]

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			Independent Assessment		Multi-part Assessment			Submission dates	
NOVEMBER 17 – PRIVATE STUDY WEEK 30th October - 3rd NOVEMBER (GSD), 6th - 10th November (MVT)																	
9	R-ESD-GSD	Gun Systems Design (GSD)		70	0	20	N	[N/A]	[06/11/17]	[17/11/17]	40	ICW	100				05/03/18 FT 09/04/18PT1 04/07/18 PT2	[By individual arrangement]
10	R-ESD-MVP	Military Vehicle Propulsion (MVP)		70	0	20	N	[N/A]	[13/11/17]	[24/11/17]	40	ICW	100				12/02/18 FT 05/03/18 PT]	[By individual arrangement]
11	R-ESD-SURV	Survivability (Surv)		35	0	10	N	[N/A]	[27/11/17]	[01/12/17]	40	ICW	100				26/02/18 FT 12/03/18 PT]	[By individual arrangement]
DECEMBER 2017 : Block 1 Examinations 11th - 15th December – Official Timetable will be Published by Registry on the VLE Christmas Break 23rd December 2017 – 1st January 2018 inc. JANUARY 2018																	
12	R-ESD-MVPD	Military Vehicle Propulsion and Dynamics (MVD&P)		32	0	10	N	[N/A]	[08/01/18]	[12/01/18]	40	ICW	100				19/03/18]	[By individual arrangement]
13	R-MAA-GW	Guided Weapons (GW)		32	0	10	Y	[N/A]	[15/01/18]	[19/01/18]	40	ICW	100				[19/03/18]	[By individual arrangement]

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

Weapon and Vehicle Systems Programme COURSE SPECIFICATION

QA&E USE ONLY: Version 3.0 July

Course / SAS Version: [1.2 (3.2.17]

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
14	R-ESD-UMVS	Uninhabited Military Vehicle Systems (UMVS)		35	0	10	N	N/A	22/01/18	26/01/18	40	ICW	100				09/04/18	By individual arrangement
15	R-ESD-VSI	Vehicle Systems Integration (VSI)		32	0	10	N	N/A	29/01/18	02/02/18	40	ICW	100				09/04/18 FT 23/04/18PT	By individual arrangement
FEBRUARY 2018																		
16	R-ESD-RSE	Reliability and Systems Effectiveness (RSE)		31	0	10	N	N/A	05/02/18	09/02/18	40	ICW	100				26/03/18 FT	By individual arrangement
17	R-EOS-RMP	Rocket Motors and Propellants (RMP)		22	0	10	Y	N/A	19/02/18	23/02/18	40	EX	100				10/4/18	By individual arrangement
18	R-ESD-LWD	Light Weapon Design(LWD)		34	0	10	N	N/A	26/02/18	02/03/18	40 / 40	OR / EX	20 / 80				02/03/18 / 19/03/18	By individual arrangement

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

Weapon and Vehicle Systems Programme COURSE SPECIFICATION

QA&E USE ONLY: Version 3.0 July

Course / SAS Version: 1.2 (3.2.17)

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
MARCH 2018: Part of March, April, May And June – PROJECT – (Hand In Date Is July -See Below) APRIL 2018: Block 2 Examinations late March/Early April - Official Timetable will be confirmed by Registry on the VLE (RM&P and LWD only) Easter Break: Good Friday – 30th March & Easter Monday – 2nd April 18 JULY 2018:																		
19	R-ESD-AFVWS	Armoured Fighting Vehicle and Weapon Systems Study (AFVWSS)		55	0	10	N	[N/A]	[10/07/18]	[19/07/18]	40	ICW	100				[23/07/18]	[By individual arrangement]
20	R-ESD-DISS	Dissertation		10	0	80	N	[n/a]	[05/03/18]	[09/07/18]	50	THESIS	100				[09/07/18]	[By individual arrangement]
PRESENTATION DAY – Wednesday 18th July 2018 (Planning assumption) - To include a meeting of the Industrial Advisory Panel - Date TBC INFORMAL EXAMINATION BOARD – Friday 27th July 20187 FORMAL EXAMINATION BOARD – Thursday 21ST September 2018 (Planning assumption only)																		

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

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Weapon and Vehicle Systems Programme COURSE SPECIFICATION

QA&E USE ONLY: Version 3.0 July

Course / SAS Version: [1.2 (3.2.17)]

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

The information contained within this table is For Reference Use Only, it is included here to show the planned dates for the modules. For all other information (i.e assessment details) see Module Descriptor pages for definitive information. Also, students must use the information provided at the time of the module for planning submission dates; it is those dates that are definitive.

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	MSc Explosives Ordnance Engineering	MSc Explosives Ordnance Engineering
R-MAA-GW	Guided Weapons	MSc Military Aerospace and Airworthiness	MSc Military Aerospace and Airworthiness
R-ESD-RSE	Reliability and System Effectiveness	MSc Military Vehicle Technology	MSc System Engineering for Defence Capability

7. How are the ILOs assessed?

The following assessment types are utilised:

Students will undertake a range of examinations, assessed coursework and project work. The mix of coursework and examinations will depend on the modules undertaken. Coursework (and to some extent examinations) will cover a range of question styles, including descriptive, technical discussions, analysis of engineering problems, and simulation of systems using computer aided engineering tools. In the final module (PgDip and MSc) students have to present their findings and defend their solution to a system problem. In addition to the above, the MSc students are also assessed in their ability to orally present and defend the findings of their project in a viva voce examination.

Assessment and ILO Mapping

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

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

Postgraduate Certificate

Award ILOs / Module Name / No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8	ILO 9	ILO 10	ILO 11
FoB (5)	ICW	ICW	EX		ICW						
WST (6)	ICW	ICW	ICW	ICW							
MVD (7)	ICW	ICW	EX	ICW	ICW		ICW				

Award ILOs Module Name / No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8	ILO 9	ILO 10	ILO 11
MVP (10)	ICW	ICW	ICW	ICW	ICW	ICW	ICW				ICW

Not all the listed modules are compulsory for both GSD and MVT PgCert. See Section 5 for details. Optional modules will allow some PgDip ILOs to be satisfied. Introductory modules (1 and 2) are not assessed so are not included in this matrix. Note that MVD and MVP will not both be taken by PgCert students.

The types of assessment are shown here for reference only – the Module Descriptor pages contain definitive information regarding the assessment of each module.

Postgraduate Diploma

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

Award ILOs Module Name / No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8	ILO 9	ILO 10	ILO 11
MSC (3)					ICW			OR		ICW	
FEE (4)			ICW		ICW			ICW			
ED (8)			ICW		ICW		ICW				
GSD (9)	ICW				ICW						ICW
Surv (11)		ICW				ICW					
MVP&D (12)							ICW		ICW		
GW (13)						ICW	ICW		ICW		
UMVS (14)			ICW		ICW	ICW					
VSI (15)				ICW		ICW	ICW				
RSE (16)							ICW	ICW		ICW	
RMP (17)						EX		EX		EX	
LWD (18)	OR	OR					EX	EX			
AFVWS (19)								ICW	ICW		ICW

MSc

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

Award ILOs Module Name / No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8	ILO 9	ILO 10	ILO 11
DISS (20)	Thesis			Thesis	Thesis	Thesis		Thesis		Thesis	Thesis

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

Title	Modules Covered	Assessment	
		Type	Weight (%)
Not Applicable on MVT or GSD	Not applicable	N/A	N/A

8. **How will the University assure the quality of the provision?**

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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?**

Invariably, students are sponsored on the course by their employer. The main reason for the sponsor providing this support is to ensure they (the students) are equipped to undertake senior positions within weapon or vehicle engineering teams in the organisation. This may be within procurement teams for ministry sponsored students or system design and development teams for industrially sponsored students.

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 Welding Engineering

Date of first publication/latest revision: May 2017

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1. **What is the course?**

Course information

Course Title	MSc in Welding Engineering
Course code	MSWEEFTC, MSWEEPTC, PDWEEFTC, PDWEEPTC, PCWEEFTC, PCWEEPTC
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	Welding Engineering and Laser Processing Centre
Course Director	Dr Paul Colegrove
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)	One year full-time, two-five years part-time

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[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: October. Part-time: throughout the year

2

Institutions delivering the course
This course is delivered by the School of Aerospace, Transport and Manufacturing, Manufacturing Theme, Welding Engineering and Laser Processing Centre where the research interests include:

- Pipeline Welding
- Aerospace Welding
- Hyperbaric Welding
- Laser Micro-Joining
- High Power Laser Welding
- Hybrid Laser/Arc Welding
- Additive Manufacture
- Weld Repair and Modelling
- Friction-based Welding

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

- students may undertake their research and/or project work off campus, or at another institution if suitable
- some teaching is provided by external agencies, or jointly with other institutions

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, Royal Aeronautical Society (RAeS) up to and including Academic year 2019-20, Institute of Materials, Minerals and Mining (IOM3) up to and including Academic year 2018-19 and The Welding Institute (TWI) up to and including Academic year 2017-18.

This qualification may also contribute to the assessment of candidates applying via the Alternative Route to study for the International Welding Engineer/Technologist/Specialist Diploma available through TWI.

2.   What are the aims of the course?

Cranfield University offers the MSc course in order to deliver graduates who are able to hold positions of significant engineering responsibility in the wide range of organisations using welding and joining technologies. The graduates will be qualified to act as responsible persons as defined by European and International quality standards, will have met a major part of the requirements for membership of the appropriate professional organisations, and will have experience and skills in the management of research and development projects. The MSc course will prepare graduates for positions of management responsibility, in the operation of welding manufacturing activities, and in acting as their company's representative to ensure that fabricated products meet quality and safety standards.

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

This programme is intended for the following range of students:

Students with a background in Engineering, Materials Science as well as those from an industrial background who are currently working as a Welding Engineer.

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

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

A. Postgraduate Certificate

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

ILO 1. Demonstrate a critical awareness of the scientific principles and industrial application of several areas of welding engineering, selected from the effect of welding on materials, welding processes, the design and analysis of welded structures, and the management of weld quality by the application of codes and standards.
ILO 2. Extract data on welding engineering from a wide range of sources, including hard copy, electronic databases and internet based sources.
ILO 3. Evaluate the quality data, and determine its relevance in research and industrial contexts.
ILO 4. Use independent learning skills to continuously advance their knowledge and understanding of welding engineering.
ILO 5. Select suitable material, welding processes and weld design for a particular application.
ILO 6. Demonstrate a critical awareness of the scientific principles and industrial application of several areas of welding engineering, selected from the effect of welding on materials, welding processes, the design and analysis of welded structures, and the management of weld quality by the application of codes and standards.
ILO 7. Appreciate the requirements of health and safety legislation in relation to welding, and demonstrate knowledge of National, European and International standards relating to quality assurance in welding.
ILO 8. Evaluate welding procedures, materials and methods to ensure fitness for purpose and compliance with National and International standards in specific areas of welding technology.
ILO 9. Manage the operation of welding and fabrication systems.

B. Postgraduate Diploma

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

ILO 10. Use conceptual thinking to critically evaluate previous and current research, to reach logical conclusions on the basis of their analysis of research data, to determine the potential for industrial application of research data, and to analyse commercial significance.
ILO 11. Plan, organise, undertake, and analyse research and industrial projects to increase knowledge and understanding of welding engineering, and to evaluate the application of welding technology in industrial applications.
ILO 12. Develop initiatives in proposing new developments, and in solving welding technology problems, both individually and as part of a team (full-time students only).
ILO 13. Communicate effectively results of developments, proposals and analyses to specialist and non-specialist audiences, both orally (Full time students only) and in writing.

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ILO 14. Demonstrate the ability to plan and manage research projects at the cutting edge of welding technology, show self-direction in the performance and analysis of welding research, and show on-going interest in advancing their knowledge and skills.

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

4. How is the course taught?

The Welding Engineering course is unique in its use of flexible learning which is used for four of the seven modules and involves providing the students a set of notes which contains a summary of the different topics covered in the course as well as additional readings for the students to refer to. The topics contain a series of Self-Assessment Questions (SAQs) which are used as a form of formative assessment, to help the students reflect on what they have learned, as well as providing them with problems that can aid learning. In delivering this material, the full-time students have a one to two hour tutorial each day over a period of two weeks. Before each tutorial session, it is expected that the students will have read through the tutorial material and attempted all the SAQs. The part-time students go through the material in their own time at home and are provided answers to the questions, once they have provided evidence of having made an attempt.

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

- Comprehensive course materials are provided, as well as a web-site using the Blackboard™ Virtual Learning Environment (VLE).
- Students are guided through the use of study texts, and use of interactive exercises.
- Full-time students have face to face discussions.

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:	
Design Project for PgCert students (9c)	10
ELECTIVE MODULES:	
Taught modules three from 2, 4, 5, 7 and either 3 or 6 and 8	50
RECOMMENDED MODULE	
Introduction	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:	
Taught modules 2-8	80
Group Project for full-time students (9a) or Dissertation for part-time students (9b)	40
ELECTIVE MODULES:	
None	
RECOMMENDED MODULE	
Introduction	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:	
Taught Modules 2-8	80
Group Project for full-time students (9a) or Dissertation for part-time students (9b)	40
Individual Research Project (10)	80
ELECTIVE MODULES:	
None	
RECOMMENDED MODULE	
Introduction	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 <u>not</u> have discretion to overrule this limit, but can refer a case to Senate's Education Committee);[3] [4]

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[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).

- **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 MSc students register for the course in October and are expected to complete the course within 11 calendar months. The technical modules and design project are delivered between October and April, thereafter the full-time students undertake an individual research project. Both taught and flexible learning modules are taught over two weeks. The second week for the taught modules is largely free of structured teaching to allow time for more independent learning and reflection.

Full-time PgDip students register for the course in October and are expected to complete the course within 7 calendar months. The technical modules and design project are delivered between October and April.

Full-time PgCert students register for the course in October and are expected to complete the course within 7 calendar months. The technical modules and design project are delivered between October and April.

The courses are also offered on a part-time basis. The overall duration of the part-time course would normally be 2-3 years; the maximum overall duration normally permitted will be 5 years. Both taught and flexible learning modules are taught over two weeks. Week's two to four of the taught modules are largely free of structured teaching to allow time for more independent learning and reflection.

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[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%).

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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	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
1	I-MAT-INWK	Introduction	Dr Sue Impey	26		0	Y		02/10/17	06/10/17	n/a	AO	n/a				n/a	
2	I-WEE-WPE	Welding Processes and Equipment [FL]	Dr Paul Colegrove	24		10	N		30/10/17	10/11/17	40	EX	100				16/11/17	Manufacturing resit exams will be during week commencing 18/09/17
3	I-WEE-A1108	Welding Systems and Research Methods	Dr Paul Colegrove	26		20	N		20/11/17	24/11/17	40	ICW	100				15/12/17 (f-t)	Re-assessment date to be set by

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[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
		[Conv]															27/03/17 (p-t)†	agreement of Course Director and Module Leader as/when required.
4	I-WEE-A1101	Design of Welded Structures [FL]	Dr Paul Colegrove	20 f-t/ 0 p-t		10	Y		16/10/17	17/11/17 †	40	EX	100				06/01/17	Manufacturing resit exams will be during week commencing 18/09/17
5	I-WEE-A1103	Welding Metallurgy [FL]	Dr Supriyo Ganguly	20		10	N		22/01/18	02/02/18 †	40	EX	100				08/02/17	Manufacturing resit exams will be during week commencing 18/09/17
6	I-WEE-A1109	Introduction to Materials for Welding Engineering [Conv]	Dr Supriyo Ganguly	34.5		10	N		09/10/16	13/10/17 †	40	EX	100				04/01/17	Manufacturing resit exams will be during week commencing 18/09/17
7	I-WEE-A1102	Management of Weld Quality [FL]	Dr Paul Colegrove	20		10	N		08/01/18	12/01/18 †	40	ICW	100				20/01/17 (f-t) 08/05/17 † (p-t)	Re-assessment date to be set by agreement of Course Director and Module Leader as/when

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
																		required.
8	I-WEE-A1110	Advanced Welding Processes [Conv]	Dr Wojciech Suder	32		10	Y		27/11/17	01/12/17 †	40	EX	100				05/02/18	Manufacturing resit exams will be during week commencing 18/09/17
9a	I-MAT-GRPP	Group Project for full-time students	Dr David Ayre	20		40	Y		08/02/17	28/04/17				80 GCW 20 ICW	GPRES GPROJ ICW Observed Behaviour	16 64 10 10	28/04/17	
9b	I-MAT-DISS	Dissertation for part-time students	Dr Paul Colegrove	20		40	Y		08/05/17 †	02/10/17 †		ICW	100				01/10/18	
9c	I-WEE-DPC	Design Project for PgCert students	Dr Paul Colegrove	10		10	N		08/02/17 †	28/04/17 †	40	ICW	100				28/04/17 †	Re-assessment date to be set by agreement of Course Director and Module Leader as/when required.
10	I-MNU-THESIS	Individual Research Project	Dr Yuchun Xu	20		80	Y		30/04/18 †	03/09/18 †		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 note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice.
† Part time students have flexibility with dates in these components   [FL]=flexible learning module   [Conv]=conventionally taught 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

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

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
I-MAT-INWK	Introduction	Manufacturing Technology and Materials Programme	Applied Nanotechnology, Advanced Materials, Aerospace Materials
I-WEE-A1101	Design of Welded Structures	Welding Engineering	Renewable Energy Marine Structures EngD
I-WEE-A1110	Advanced Welding Processing	Welding Engineering	Manufacturing Technology and Management, Aerospace Manufacturing, Renewable Energy Marine Structures EngD
I-MAT-GRPP	Group Project for Full Time Students	Manufacturing Technology and Materials Programme	Advanced Materials, Aerospace Materials, Applied Nanotechnology, Manufacturing Technology and Management, Aerospace Manufacturing, Engineering and Management of Manufacturing Systems, Global Product Development and Management, Knowledge Management for Innovation (not currently running), Management and Information Systems, Cyber-Secure Manufacturing
I-MAT-DISS	Dissertation	Manufacturing Technology and Materials Programme	Advanced Materials, Aerospace Materials, Applied Nanotechnology, Manufacturing Technology and Management, Aerospace Manufacturing, Engineering and Management of Manufacturing Systems, Global Product Development and Management, Knowledge Management for Innovation (not currently running), Management and Information Systems, Cyber-Secure Manufacturing
I-MNU-THESIS	Individual Research Project	Aerospace Manufacturing	Cyber-Secure Manufacturing, Engineering and Management of Manufacturing Systems, Global Product Development and Management, Knowledge Management for Innovation (not currently running), Management and Information Systems, Advanced Materials, Aerospace Materials, Applied Nanotechnology, Manufacturing Technology and Management

7. **How are the ILOs assessed?**

The following assessment types are utilised:

Students can expect to have either examinations or assessment by submitted work and elements of assessment by presentation or viva.

This approach has been adopted in order to ensure that students demonstrate their understanding through a wide range of learning techniques, but are not disadvantaged through any one approach.

Assessment and ILO Mapping

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

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

A. Postgraduate Certificate

Award ILOs / Module No.	ILO 1.	ILO 2.	ILO 3.	ILO 4.	ILO 5.	ILO 6.	ILO 7.	ILO 8.	ILO 9.
1									
2	EX				EX	EX	EX		
3	ICW	ICW	ICW	ICW					
4	EX				EX	EX	EX		
5	EX				EX	EX			
6	EX				EX	EX			
7	ICW					ICW	ICW	ICW	ICW
8	EX				EX	EX	EX		
9c	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.	LO 1.	LO 2.	LO 3.	LO 4.	LO 5.	LO 6.	LO 7.	LO 8.	LO 9.	LO 10.	LO 11.	LO 12.	LO 13.
9a	GPROJ	GPROJ	GPROJ	GPROJ		GPROJ				GPROJ	GPROJ	GPROJ	GPROJ GPRES
9b	ICW	ICW	ICW	ICW		ICW				ICW	ICW	ICW*	ICW*

* Note that not all aspects of the learning outcome apply to part-time students who don't participate in group work or do an oral presentation.

C. MSc

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

Award ILOs / Module No.	ILO 1.	ILO 2.	ILO 3.	ILO 4.	ILO 5.	ILO 6.	ILO 7.	ILO 8.	ILO 9.	ILO 10.	ILO 11.	ILO 12.	ILO 13.	ILO 14.
10	THESIS	THESIS	THESIS	THESIS		THESIS				THESIS	THESIS	THESIS	THESIS OR	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?

Successful students develop diverse and rewarding careers in engineering management in a wide range of organisations deploying welding technologies. Roles include the management of welding manufacturing operations, and management of design and fabrication of welded structures. The international nature of such activities means that career opportunities are not restricted to the UK. Cranfield graduates develop careers around the world.