



# Course Libraries 2018/19

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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:** Postgraduate Certificate Defence and Security Export

**Date of first publication/latest revision:** January 2019

#### **1. What is the course?**

##### **Course information**

<b>Course Title</b>	Defence and Security Export
<b>Course code</b>	PCDSEPTR, SPDSEPTR
<b>Academic Year</b>	2018/19
<b>Valid entry routes</b>	PgCert, Short Courses for Credit
<b>Additional exit routes</b>	PgCert
<b>Mode of delivery</b>	Part-time
<b>Location(s)<sup>1</sup> of Study</b>	Cranfield
<b>School(s)</b>	Defence and Security and School of Management
<b>Theme</b>	Defence and Security
<b>Centre</b>	Centre for Defence Management and Leadership
<b>Course Director</b>	Professor Ron Matthews
<b>Awarding Body</b>	Cranfield University
<b>Is this an AP Contract course?<sup>2</sup></b>	No
<b>Teaching Institution</b>	Cranfield University
<b>Admissions body</b>	Cranfield University
<b>Entry requirements</b>	Standard University Entry Requirements
<b>UK Qualifications Framework Level</b>	QAA FHEQ Level 7
<b>Benchmark Statement(s)</b>	Business and Management

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

<sup>2</sup> AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

<b>Registration Period(s) available</b>	24 Months: registration extends across two years to allow for flexibility in student study scheduling
<b>Course Start Month(s)</b>	January 2019

### **Institutions delivering the course**

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

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

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

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

### **Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)**

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

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

Cranfield University offers this course in order to:

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

This programme is intended for the following range of students:

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

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

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

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

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

#### **4. How is the course taught?**

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

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

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

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

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

##### **A. Postgraduate Certificate**

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Modules 1-7	60
<b>ELECTIVE MODULES:</b>	
<b>TOTAL:</b>	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  $\geq 50\%$ ;
- An average mark of  $\geq 50\%$  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);<sup>3 4</sup>
- **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  $\geq 50\%$  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  $\geq 40$  credits, which are not part of the taught assessment average), the pass mark of  $\geq 50\%$  (where they exist);
- **For the thesis**, a mark of  $\geq 50\%$  in order to receive a pass (where it exists).

## 6. How is the course structured?

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

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<sup>3</sup> 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).

<sup>4</sup> 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%).

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

## Course modules

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

Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
1	R-DMR-IS	Introductory Studies	Miss Paula MacPhee	7	N/A	0	N	N/A	21/01/19	21/01/19	N/A	AO	N/A				N/A	N/A
2	R-DMR-LEPDSF	Legal, Ethical and Political Defence & Security Frameworks	Professor Ann Fitz-Gerald	21	2	10	Y	14/01/19	21/01/19	24/01/19	40	ICW	100				18/03/19	17/06/19

<sup>5</sup> Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

<sup>6</sup> Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

<sup>7</sup> 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%.

<sup>8</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>9</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>10</sup> 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.

<sup>11</sup> Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

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



Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment								
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates		
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date	
		(incl. SoM induction day)																	
3	R-DMR-DSM	Defence & Security Marketing	Mr Richard Fisher	21	4	10	Y	11/03/19	18/03/19	20/03/19	40	ICW	100				13/05/19	12/08/19	
4	R-DMR-N	Negotiations	Dr Robby Allen	21	0	10	N	06/05/19	14/05/19	16/05/19	40	ICW	100				08/07/19	07/10/19	
5	R-DMR-DSO	Defence & Security Offset	Professor Ron Matthews	21	0	10	Y	01/07/19	08/07/19	10/07/19	40	ICW	100				02/09/19	02/12/19	
6	R-DMR-STCC	Strategic Trade Controls and Compliance	Professor Ron Matthews	21	0	10	Y	09/09/19	16/09/19	18/09/19	40	ICW	100				11/11/19	10/02/20	
7	R-DMR-ISP	Independent Study Project	Miss Paula MacPhee	7 (plus 13 individual supervision)	0	10	N	09/09/19	19/09/19	19/09/19	40	ICW	100				06/01/20	N/A	

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

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

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

## 7. How are the ILOs assessed?

The following assessment types are utilised:

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

This approach has been adopted because:

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

## Assessment and ILO Mapping

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

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

**A.**

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

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

Title	Modules Covered	Assessment	
		Type	Weight (%)
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 one member of professional staff. Panels are supported by an appropriately trained Secretary who acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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

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

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

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

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

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

New Partnership arrangements are considered in two stages:

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

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

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

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

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

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

## **COURSE SPECIFICATION**

### **Cranfield University: Course Specifications**

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

**COURSE TITLE:** MSc in Defence Cyber Masters Programme

**Date of first publication/latest revision:** 24 May 2018

#### **1. What is the course?**

##### **Course information**

<b>Course Title</b>	Defence Cyber Masters Programme
<b>Course code</b>	MSCSOPTR, MSCDIPTR, PDCSOPTR, PDCDIPTR, PCCSOPTR, PCCDIPTR, SPCSOPTR, SPCDIPTR
<b>Academic Year</b>	2018/19
<b>Valid entry routes</b>	MSc, PgDip, PgCert Cyber Defence and Information Assurance (CDIA) MSc, PgDip, PgCert Cyberspace Operations (CSOps)
<b>Additional Exit routes</b>	PgDip Cyber Defence and Information Assurance PgCert Cyber Defence and Information Assurance PgDip Cyberspace Operations PgCert Cyberspace Operations
<b>Mode of delivery</b>	Part-time Flexible learning
<b>Location(s)<sup>1</sup> of Study</b>	Shrivenham
<b>School(s)</b>	Cranfield Defence and Security
<b>Theme</b>	Defence and Security
<b>Centre</b>	Centre for Electronic Warfare, Information and Cyber
<b>Programme Director Course Directors</b>	Mr Ross Harris Mr Ian Owens (CDIA) Mr Darren Lawrence (CSOps)
<b>Awarding Body</b>	Cranfield University
<b>Is this an AP Contract course?<sup>2</sup></b>	Yes
<b>Teaching Institution</b>	Cranfield University
<b>Admissions body</b>	Cranfield University
<b>Entry requirements</b>	1st or 2nd class honours degree; 3rd class degree with three years

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

<sup>2</sup> AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

	relevant experience; pass degree with five years relevant experience; HND/C with seven years relevant experience. Exceptional candidates may be accepted with 10 years relevant experience, where relevant experience is gained in Information Security, Information Operations, information risk or related role. Students whose first language is not English must also attain an IELTS score of 6.5. Owing to security classification, and course purpose, only UK Government sponsored and security-cleared students with a justifiable interest in cyberspace operations will be enrolled on the CSOps named award or the Cyberwarfare in Intelligence and Military Operations module.
<b>UK Qualifications Framework Level</b>	QAA FHEQ level 7 (Masters)
<b>Benchmark Statement(s)</b>	N/A
<b>Registration Period(s) available</b>	Part-time MSc - up to five years, Part-time PgCert - up to three years, Part-time PgDip - up to four years  (For MOD status students the duration may vary, subject to annual review.)
<b>Course Start Month(s)</b>	October

### **Institutions delivering the course**

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

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

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

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

### **Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)**

Accreditation will be sought as appropriate.

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

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

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

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

This programme is intended for the following range of students:

### **CDIA**

- Government, corporate and critical information infrastructure staff who are one or more of the following:
  - Managers who need to understand information risk and respond to cyber threats
  - Technicians who wish to understand the operational and business context
  - Procurement staff commissioning critical or sensitive projects
  - Policy and planning staff interested in computer network and security operations
  - Personnel interested in social media and associated concepts such as cyber mobilization.
  - Those charged with accreditation and assessment of security measures

### **CSOps**

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

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

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

#### **A. Postgraduate Certificate common to both named awards**

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

- ILO 1. Critically assess an organisation's Information Security and Information Assurance policy, strategy and plans, with a view to improvement.
- ILO 2. Critically appraise approaches to measuring risk.
- ILO 3. Evaluate the opportunities and limitations afforded by emergent security technologies.
- ILO 4. Develop security requirements in the context of acquisition.
- ILO 5. Determine effective approaches to managing and exploiting social media and pervasive technologies

#### **Specific to CDIA**

- ILO 6. Appraise best practice in network defence and security operations management in the context of interdependence and critical infrastructure.
- ILO 7. Evaluate the human dimension of security technologies, processes and behavioural change programmes and plan for improvement in an organisational context.

#### **Specific to CSOps**

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

- ILO 9. Assess theories of decision-making and sense-making and evaluate their utility in effects planning in the C2 context.
- ILO 10. Assess cyber technical approaches that support military effect.

## **B. Postgraduate Diploma**

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

- ILO 11. Critically evaluate a range of approaches to understanding complex and changing cyber environments.
- ILO 12. Appraise the techniques that can be used to design investigation, problem formulation and structuring, and interpretation of data.
- ILO 13. Analyse and scope a complex cyber problem-space with a view to action and improvement.
- ILO 14. Judge ethics and ethicality at each stage of planning and activity.
- ILO 15. Develop problem definition, analysis and problem solving skills to address challenges faced in cyber issues.
- ILO 16. Argue coherently and demonstrate knowledge of personal strengths and weaknesses.
- ILO 17. For CSOps only – Assess operational impact of proposed interventions.
- ILO 18. For CDIA only – Assess business impact of proposed interventions.

## **C. MSc**

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

- ILO 19. Independently and confidently be able to apply appropriate theories, tools and/or techniques to a cyber-related situation, or situations, as appropriate to the student's named award
- ILO 20. Critically evaluate the published literature and synthesise the identified concepts
- ILO 21. Judge appropriate research approaches for conducting research and draw justifiable inferences from the data and analysis generated and present a self-critical discussion of the results with conclusions
- ILO 22. Display practical ability in self-directed research to produce a high quality thesis.

## **4. How is the course taught?**

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



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

Modules are delivered in a variety of formats based on the subject content requirements. The ten-credit modules fall into four basic categories:

- 13 week modules; 2.5-3 day compulsory residential with three online activities (these may be before and/or after the residential), assignment due in week 13 (FMC, CATO, ST, THD, CNPC and RM)
- 7 week modules, type A; three weeks' pre-work, one week compulsory residential, three weeks self-study, assignment due in week 7 (DLDS and IM)
- 7 week module, type B; one week residential, six weeks self-study, assignment due in week 7 (CSTP)
- Online only; 13 week online only module (UR)
- Online; 18 week online module plus a compulsory one day residential (ETM)

The two 20 credit modules are structured as:

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

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

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

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

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

## **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 Cyber Defence and Information Assurance**

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

Description	Credits
-------------	---------

<b>COMPULSORY MODULES:</b>	
Foundations: Management of Cyber	10
The Human Dimension	10
Critical Networks and Process Control	10
<b>ELECTIVE MODULES: Chose 30 credits from the following modules</b>	
Understanding Risk	10
Cyber Attack – Threats and Opportunities	10
Social Technologies	10
Data Led Decision Support	10
Emerging Technology Monitoring	10
Incident Management	10
<b>TOTAL:</b>	<b>60</b>

#### B. Postgraduate Certificate in Cyberspace Operations

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Foundations: Management of Cyber	10
Cyberwarfare in Intelligence and Military Operations	20
<b>ELECTIVE MODULES: Chose 30 credits from the following modules</b>	
Understanding Risk	10
Cyber Attack – Threats and Opportunities	10
Social Technologies	10
Data Led Decision Support	10
Emerging Technology Monitoring	10
Incident Management	10
<b>TOTAL:</b>	<b>60</b>

#### C. Postgraduate Diploma in Cyber Defence and Information Assurance

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Foundations: Management of Cyber	10
The Human Dimension	10
Critical Networks and Process Control	10
Understanding Risk	10
Cyber Attack – Threats and Opportunities	10
Social Technologies	10
Incident Management	10
Cyber Systems Thinking and Practice	10
Research Methods	10

Applied Cyber Concepts Project	10 20
<b>ELECTIVE MODULES:</b>	
Choose 10 credits from the following modules: Data Led Decision Support Emerging Technology Monitoring	10 10
<b>TOTAL:</b>	<b>120</b>

#### D. Postgraduate Diploma in Cyberspace Operations

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Foundations: Management of Cyber	10
Understanding Risk	10
Cyber Attack – Threats and Opportunities	10
Social Technologies	10
Cyberwarfare in Intelligence and Military Operations	20
Data Led Decision Support	10
Incident Management	10
Cyber Systems Thinking and Practice	10
Research Methods	10
<b>ELECTIVE MODULES:</b>	
Choose 20 credits from the following modules: The Human Dimension Critical Networks and Process Control Applied Cyber Concepts Project	10 10 20
Choose 10 credits from the following modules: Data Led Decision Support Emerging Technology Monitoring	10 10
<b>TOTAL:</b>	<b>120</b>

#### E. MSc in Cyber Defence and Information Assurance

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Foundations: Management of Cyber	10
The Human Dimension	10

Critical Networks and Process Control	10
Understanding Risk	10
Cyber Attack – Threats and Opportunities	10
Social Technologies	10
Incident Management	10
Cyber Systems Thinking and Practice	10
Research Methods	10
Applied Cyber Concepts Project	20
Dissertation	80
<b>ELECTIVE MODULES:</b>	
Choose 10 credits from the following modules:	
Data Led Decision Support	10
Emerging Technology Monitoring	10
<b>TOTAL:</b>	<b>200</b>

#### F. MSc in Cyberspace Operations

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Foundations: Management of Cyber	10
Understanding Risk	10
Cyber Attack – Threats and Opportunities	10
Social Technologies	10
Cyberwarfare in Intelligence and Military Operations	20
Incident Management	10
Cyber Systems Thinking and Practice	10
Research Methods	10
Dissertation	80
<b>ELECTIVE MODULES:</b>	
Choose 20 credits from the following modules:	
The Human Dimension	10
Critical Networks and Process Control	10
Applied Cyber Concepts Project	20
Choose 10 credits from the following modules:	
Data Led Decision Support	10
Emerging Technology Monitoring	10
<b>TOTAL:</b>	<b>200</b>

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  $\geq 50\%$ ;
- An average mark of  $\geq 50\%$  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);<sup>3 4</sup>
- **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  $\geq 50\%$  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  $\geq 40$  credits, which are not part of the taught assessment average), the pass mark of  $\geq 50\%$  (where they exist);
- **For the thesis**, a mark of  $\geq 50\%$  in order to receive a pass (where it exists).

## 6. How is the course structured?

This course is only offered on a part-time basis and delivered in a flexible learning style. Students are required to begin with the Foundations: Management of Cyber module but then are free to undertake the modules as fits their own requirements; noting the pre-requisites applied to some modules. Students are expected to study for no more than 20 credits at any one time, except modules in parallel with the ACCP. On average students are expected to study 40 to 60 credits per academic year. The quickest time for completion of the whole Masters is 3 years.

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<sup>3</sup> 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).

<sup>4</sup> 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar				Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Module Taught Phase End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
													Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting (%) of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
1	R-DEFCY-FMC	Foundations: Management of Cyber	Dr Ruth Massie	36	0	10	N	01/10/18	01/10/18	05/10/18	30/11/18	40	ICW	100%				08/01/19	Oct 19-Jan 20
2	R-DEFCY-UR	Understanding Risk	Dr Natalie Clewley	36	0	10	N	22/10/18	N/a	N/a	14/12/18	40	ICW	100%				29/01/19	Oct 19-Jan 20
3	R-DEFCY-CA	Cyber Attack – Threats and Opportunities	Adam Zagorecki	36	0	10	N	21/01/19	11/02/19	13/02/19	22/03/19	40	ICW	100%				16/04/19	Jan-Apr 20

<sup>5</sup> Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

<sup>6</sup> Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

<sup>7</sup> 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.

<sup>8</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>9</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>10</sup> 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.

<sup>11</sup> 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; IPRACT – Individual Practical; 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar				Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Module Taught Phase End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
													Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting (%) of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
4	R-DEFCY-ST	Social Technologies	Robert Black	36	0	10	N	28/01/19	13/02/19	15/02/19	29/03/19	40	ICW	100%				23/04/19	Jan-Apr 20
5	R-SISD-DLDS	Data Led Decision Support	Dr Duncan Hodges	30	0	10	Y	01/04/19	23/04/19	26/04/19	26/04/19	40	GCW ICW	25% 75%				26/04/19 20/05/19	Mar – May 20
6	R-SISD-ETM	Emerging Technology Monitoring	Ian Owens	7		10	Y	07/01/19	12/02/19 Compulsory one day	13/05/19	13/05/19	40	ICW	100%				13/05/19	Jan – May 20
7	R-DEFCY-IM	Incident Management	Dr Paul Yoo	35	0	10	N	A 20/08/18	10/09/18	14/09/18	14/09/18	40			100	GPRAC ICW	30% 70%	14/09/18 08/10/18	Dec -18 – Feb 19
								B 10/12/18	07/01/19	11/01/19	11/01/19	40			100	GPRAC ICW	30% 70%	11/01/19 04/02/19	Aug – Oct 19
8	R-DEFCY-CN	Critical Networks and Process Control	Dr Duncan Hodges	36	0	10	N	13/05/19	03/06/19	05/06/19	12/07/19	50	ICW	100%				06/08/19	May – Aug 20
9	R-DEFCY-HD	The Human Dimension	Antoinette Caird-Daley	36	0	10	N	20/05/19	05/06/19	07/06/19	19/07/19	50	ICW	100%				13/08/19	May – Aug 20
10	R-DEFCY-CIMO	Cyberwarfare in Intelligence and Military Operations	Robert Black	72	0	20	N	13/05/19	03/06/19	07/06/19	19/07/19	50	ICW	100%				13/08/19	May – Aug 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

Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar				Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Module Taught Phase End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
													Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting (%) of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
11	R-DEFCY-CSTP	Cyber Systems Thinking and Practice	Jeremy Hilton	35	0	10	N	A 20/08/18	10/09/18	14/09/18	14/09/18	40			100%	GPRES ICW	30% 70%	12/09/18 30/10/18	Aug – Oct 19
								B 05/11/18	26/11/18	30/11/18	30/11/18	40			100%	GPRES ICW	30% 70%	28/11/18 22/01/19	Aug – Oct 19
12	R-DEFCY-RM	Research Methods	Antoinette Caird-Daley	36	0	10	N	A 03/12/18	10/12/18	12/12/18	01/02/19	40	ICW	100%				12/03/19	Jun - Sep 19
								B 17/06/19	24/06/19	26/06/19	09/08/19	40	ICW	100%				17/09/19	Dec 19 - Mar 20
13	R-DEFCY-ACCP	Applied Cyber Concepts Project	Dr Nikki Williams	18	0	20	N	05/11/18	N/a	N/a	14/12/18	50	ICW	100%				02/04/19	Nov 19 – Apr 20
								15/04/19	N/a	N/a	24/05/19							03/09/19	Nov 19 – Apr 20
14	R-DEFCY-DISS	Dissertation	Antoinette Caird-Daley	36	0	80	N	A 28/09/18	N/a	N/a	N/a	50	Thesis	100%				30/09/19	Examiners Discretion
								B 31/01/19	N/a	N/a	N/a	50	Thesis	100%				31/01/20	
								C 29/03/19	N/a	N/a	N/a	50	Thesis	100%				31/03/20	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRACT – Individual Practical; 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar				Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Module Taught Phase End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
													Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting (%) of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
								D 31/07/19	N/a	N/a	N/a	50	Thesis	100%				31/07/20	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPAC – Individual Practical; GPAC – 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.

<u>Module code</u>	<u>Module title</u>	<u>Course that owns the module</u>	<u>Other course(s)/ programme(s) that use the module</u>
R-SISD-DLDS	Data Led Decision Support	Information Capability Management	Defence Cyber Masters Programme
R-SISD-ETM	Emerging Technology Monitoring	Information Capability Management	Defence Cyber Masters Programme

## 7. How are the ILOs assessed?

The following assessment types are utilised:

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

### **Summative Assessment:**

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

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

## **Assessment and ILO Mapping**

### **A. Postgraduate Certificate**

<b>Award ILOs</b>	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8	ILO 9	ILO 10
<b>Module</b>						CDIA Only		CSOps Only		
FMC	ICW			ICW						
UR		ICW								
CATO		ICW	ICW							
ST			ICW		ICW					

Award ILOs Module	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8	ILO 9	ILO 10
						CDIA Only		CSOps Only		
DLDS	ICW									
ETM			ICW							
IM	ICW		ICW		ICW					
CNPC						ICW				
THD							ICW			
CIMO								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 11	ILO 12	ILO 13	ILO 14	ILO 15	ILO 16	ILO 17 (CSOps Only)	ILO 18 (CDIA only)
DLDS		ICW GCW						
IM					ICW GPRAC			
CIMO							ICW	
CSTP	ICW	ICW	ICW		ICW GPRES			
RMM	ICW	ICW	ICW	ICW	ICW	ICW		
ACCP			ICW		ICW		ICW	ICW

## C. MSc

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

Award ILOs Module No.	ILO 19	ILO 20	ILO 21	ILO 22
DISS	Thesis	Thesis	Thesis	Thesis

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

N/a			

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

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

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

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

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

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

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

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

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

New Partnership arrangements are considered in two stages:

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

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

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

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

The course aims to ensure that graduates are better prepared to tackle the current and emerging demands of cyberspace. Given the rapidly changing nature of the threat and capability landscape this education will allow graduates to recognise emerging threats and respond effectively and proactively. As the course ties together a broad technical and business base, and is supported by a wide range of public and private sector organisations, the qualification will be noteworthy on the CVs of those wishing to move into strategic and operational positions in defence and businesses enabled by the information revolution.

## **COURSE SPECIFICATION**



### **Cranfield University: Course Specifications**

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

**COURSE TITLE:** MSc Defence Leadership

**Date of first publication/latest revision:** 04/06/2018

#### **1. What is the course?**

##### **Course information**

<b>Course Title</b>	Defence Leadership
<b>Course code</b>	MSDLSPTR – PDDLSPTR – PCDLSPTR - SPDLSPTR
<b>Academic Year</b>	18/19
<b>Valid entry routes</b>	PgCert, PgDip, MSc
<b>Additional exit routes</b>	PgCert, PgDip,
<b>Mode of delivery</b>	Part-time
<b>Location(s)<sup>1</sup> of Study</b>	Shrivenham
<b>School(s)</b>	Cranfield Defence and Security
<b>Theme</b>	Leadership and Management
<b>Centre</b>	Centre for Defence Leadership and Management
<b>Course Director</b>	Dr Bryan Watters
<b>Awarding Body</b>	Cranfield University
<b>Is this an AP Contract course?<sup>2</sup></b>	Yes
<b>Teaching Institution</b>	Cranfield University
<b>Admissions body</b>	Cranfield University
<b>Entry requirements</b>	Standard University entry requirements
<b>UK Qualifications Framework Level</b>	QAA FEHQ Level 7 (Masters)
<b>Benchmark Statement(s)</b>	N/A
<b>Registration Period(s)</b>	5 Years, MSc, 4 Years PG Dip, 3 Years PG Cert

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

<sup>2</sup> AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

<b>available</b>	
<b>Course Start Month(s)</b>	January

### **Institutions delivering the course**

This course is delivered by the Centre for Defence Management and Leadership within the Cranfield School of Defence and Security where the research interests include: Innovations in Leadership Development, Personal Construct Theory, Toxic Leadership, Leadership and Gender, Insurgent and Non-formal Leadership, and Developments in Leadership Theory.

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

### **Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)**

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

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

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

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

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

This programme is intended for students who will be able to add real value to the examination of defence leadership in general and to their subsequent appointments in defence ministries, procurement and logistics agencies, the Armed Forces or defence industry.

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

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

### **A. Postgraduate Certificate in Defence Leadership**

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

- ILO 1. Demonstrate a systematic knowledge of the relationship between leadership theory, practice and context and describe the trends which have shaped the relationship.
- ILO 2. Exhibit a conceptual awareness and knowledge of their own leadership styles, behaviours and preferences.
- ILO 3. Critically appraise examples of leadership failure and success in the defence sector.
- ILO 4. Evaluate the influence and impact of both external and internal contexts and actors on defence leadership.
- ILO 5. Critically analyse the application of leadership ideas, theories and concepts to a specific defence context.

### **B. Postgraduate Diploma in Defence Leadership**

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

- ILO 6. Demonstrate awareness of the critical role of contexts and situations in the success and failure of leadership in the defence sector.
- ILO 7. Critically evaluate the leadership development needs of others in the defence sector.
- ILO 8. Develop a thorough awareness of contemporary theories and models of leadership in the defence sector.
- ILO 9. Synthesise knowledge to develop frameworks which inform defence leadership styles and behaviours for particular situations.
- ILO 10. Formulate practical skills to select, develop and appraise successfully the leadership of others in the defence sectors.
- ILO 11. Evaluate contemporary developments in the academic conceptualisation of leadership in the defence sector.

### **C. MSc in Defence Leadership**

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

- ILO 12. Distinguish the underpinning academic subject matter relating to leadership in the defence sector.
- ILO 13. Critically appraise the role of leadership in defence
- ILO 14. Design and conduct an individual research project to address defence leadership issues.
- ILO 15. Design sound social science research to explore a particular defence related research question.
- ILO 16. Develop transferable skills in interview and questionnaire techniques.



#### **4. How is the course taught?**

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

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

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

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

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 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
<b>COMPULSORY MODULES:</b>	
Modules 1-6	10 credits per module
<b>ELECTIVE MODULES:</b>	
N/A	
<b>TOTAL:</b>	<b>60</b>

##### **B. Postgraduate Diploma**

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
1-12	10 credits per module
<b>ELECTIVE MODULES:</b>	
N/A	

<b>TOTAL:</b>	<b>120</b>
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### 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
<b>COMPULSORY MODULES:</b>	
Modules: 1-12	120
13: R-DL-RM	10
14: R-DL-DISS	70
<b>ELECTIVE MODULES:</b>	
N/A	
<b>TOTAL:</b>	<b>200</b>

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  $\geq 50\%$ ;
- An average mark of  $\geq 50\%$  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);<sup>3 4</sup>
- **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  $\geq 50\%$  across the taught assessments);

<sup>3</sup> 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).

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

- if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
- it is 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  $\geq 40$  credits, which are not part of the taught assessment average), the pass mark of  $\geq 50\%$  (where they exist);
- **For the thesis**, a mark of  $\geq 50\%$  in order to receive a pass (where it exists).

## 6. **How is the course structured?**

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

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

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

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

## Course modules<sup>5</sup>

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 <sup>6</sup>	Total hours delivered by Visiting Lecturers <sup>7</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>8</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>9</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>10</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>11</sup>	Assessment Submission and/or exam date <sup>12</sup>	Assessment / Exam Retake date
1	R-DL-IS	Introductory Studies & CriticalThinking	Paula Macphee	20		10	N	13/01/19	13/01/19	15/01/19	50	ICW	100				25/02/19	Next Assessment Opportunity
2	R-DL-LSCM	Leadership Studies - Classical & Modern	Bryan Watters	20	2	10	N	16/01/19	16/01/19	18/01/19	50	ICW	100				08/04/19	Next Assessment Opportunity

<sup>5</sup> Please see Senate Handbook for Setting Up a New Taught Course for guidance on completing this table

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

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

<sup>8</sup> 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.

<sup>9</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>10</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>11</sup> 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.

<sup>12</sup> 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 <sup>6</sup>	Total hours delivered by Visiting Lecturers <sup>7</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment								
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>8</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates		
												Type of Assessment	Weighting within module <sup>9</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>10</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>11</sup>	Assessment Submission and/or exam date <sup>12</sup>	Assessment / Exam Retake date	
3	R-DL-SMD	Strategic Management in Defence	Ifti Zaidi	20	2	10	N	12/05/19	12/05/19	14/05/19	50	ICW	100				01/07/19	Next Assessment Opportunity	
4	R-DL-PL	Psychology of Leadership	Rebecca McKeown	20	0	10	N	15/05/19	15/05/19	17/05/19	50 50	ICW RP	30 70				12/08/19 12/08/19	Next Assessment Opportunity	
5	R-DL-DSOB	Defence Sector & Organisational Behaviour	Robby Allen	20	0	10	N	20/10/19	20/10/19	22/10/19	50	ICW	100				09/12/19	Next Assessment Opportunity	
6	R-DL-PPM	Foundations of Defence Project and Programme Management	Bill Egginton	20	0	10	N	23/10/19	23/10/19	25/10/19	50	ICW	100				20/01/20	Next Assessment Opportunity	
7	R-DL-LCI	Leading Change and Innovation	Ifti Zaidi	20	2	10	N	03/02/19	03/02/19	05/02/19	40	ICW	100				25/03/19	Next Assessment Opportunity	
8	R-DL-NSRC	National Security: Resilience and Crisis	Bryan Watters	20	4	10	N	06/02/19	06/02/19	08/02/19	40	ICW	100				06/05/19	Next Assessment Opportunity	

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

Module Number	Module code	Title	Module Leader	Contact hours <sup>6</sup>	Total hours delivered by Visiting Lecturers <sup>7</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment								
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>8</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates		
												Type of Assessment	Weighting within module <sup>9</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>10</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>11</sup>	Assessment Submission and/or exam date <sup>12</sup>	Assessment / Exam Retake date	
9	R-DL-GSCC	Global Security: Culture and Complexity	Bryan Watters	20	1	10	N	19/05/19	19/05/19	21/05/19	40	ICW	100					08/07/19	Next Assessment Opportunity
10	R-DL-GSEC	Global Security: Emerging Challenges	Anastasia Filippidou	20	0	10	N	22/05/19	22/05/19	24/05/19	40	ICW	100					19/08/19	Next Assessment Opportunity
11	R-DL-LDD	Leadership Development in Defence	Ifti Zaidi	20	12	10	N	17/11/19	17/11/19	19/11/19	40	ICW	100					13/01/20	Next Assessment Opportunity
12	R-DL-CDLS	Contemporary Defence Leadership Studies	Bryan Watters	20	6	10	N	20/11/19	20/11/19	22/11/19	40	ICW	100					24/02/20	Next Assessment Opportunity
13	R-DL-RM	Research Methods	Ifti Zaidi	20	0	10	N	21/01/18	21/01/19	25/01/19	50	ICW	100					11/02/19	

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

Module Number	Module code	Title	Module Leader	Contact hours <sup>6</sup>	Total hours delivered by Visiting Lecturers <sup>7</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>8</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>9</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>10</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>11</sup>	Assessment Submission and/or exam date <sup>12</sup>	Assessment / Exam Retake date
14	R-DL-DISS	Dissertation	Bryan Watters	30	0	70	N	25/01/19	N/A	N/A	50	THESIS	100				30/01/20	

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

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

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

## 6. How are the ILOs assessed?

The ILOS are assessed by individual coursework developing critical thinking and argument together with a research based dissertation. The individual coursework focuses on applying theory to live practice and case study.

### Assessment and ILO Mapping

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

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

#### A. Postgraduate Certificate in Defence Leadership

<b>Award ILOs</b> <b>Module No.</b>	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5
1: IS			ICW	ICW	ICW
2: LSCM	ICW		ICW	ICW	ICW
3: SMD				ICW	ICW
4: PL	ICW RP	ICW RP		RP	ICW RP
5: DSOB	ICW			ICW	ICW
6: PPM	ICW	ICW	ICW	ICW	ICW

#### B. Postgraduate Diploma in Defence Leadership

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

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



## C. MSc

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

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

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

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

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

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

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

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

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

Each course has a formally constituted Examination Board, which includes the External Examiner, and which is responsible for ensuring that awards are made within the Regulations of the

University and that students are made awards on the basis of meeting the specified Intended Learning Outcomes of a course at the appropriate standard.

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

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

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

New Partnership arrangements are considered in two stages:

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

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

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

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

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

## **COURSE SPECIFICATION**



### **Cranfield University: Course Specifications**

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

**COURSE TITLE:** MSc in Design of Rotating Machines

**Date of first publication/latest revision:** 19/9/18

#### **1. What is the course?**

##### **Course information**

<b>Course Title</b>	Design of Rotating Machines
<b>Course code</b>	MSDRMFTC, MSDRMPTC, PDDRMFTC, PDDRMPTC, PCDRMFTC, PCDRMPTC
<b>Academic Year</b>	2018/19- No new entries, teach out only
<b>Valid entry routes</b>	MSc
<b>Additional exit routes</b>	PgDip, PgCert
<b>Mode of delivery</b>	Full-time, Part-time
<b>Location(s)<sup>1</sup> of Study</b>	Cranfield
<b>School(s)</b>	School of Water, Energy and Environment
<b>Theme</b>	Energy & Power
<b>Centre</b>	Centre for Power Engineering
<b>Programme Director Course Director</b>	Dr Gill Drew Dr Joao Amaral Teixeira
<b>Awarding Body</b>	Cranfield University
<b>Is this an AP Contract course?<sup>2</sup></b>	No
<b>Teaching Institution</b>	Cranfield University
<b>Admissions body</b>	Cranfield University
<b>Entry requirements</b>	Standard University entry requirements
<b>UK Qualifications Framework Level</b>	QAA FHEQ Level 7 (Masters)
<b>Benchmark Statement(s)</b>	N/A

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

<sup>2</sup> AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

<b>Registration Period(s) available</b>	Full-time MSc - one year, Part-time MSc - up to three years
<b>Course Start Month(s)</b>	October

### **Institutions delivering the course**

This course is delivered by Centre for Power Engineering where the research interests include: Design and engineering of advanced power system components, electrical power and drives, materials, component life prediction and process/component monitoring.

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

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

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

In addition a number of lectures or courses are delivered by experienced engineers. This offers the students a beneficial opportunity to understand current industrial practices.

The course has also built strong double-degree partnerships with academic institutions in France, Spain and Italy. Similar arrangements are either in place or being developed with institutions in other countries including Poland, Libya and Nigeria.

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

### **Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)**

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

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

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

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

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

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

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

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

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

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

This programme is intended for the following range of students:

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

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

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

#### **A. PgCert in Design of Rotating Machines**

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

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

- ILO 2. Critically analyse the stability of a range of rotating machines and be able to suggest remedial solutions in cases of potential or actual instability.
- ILO 3. Apply effectively structural analysis techniques and theories in support of the design and evaluation of rotating equipment and its components.
- ILO 4. Conduct critical analysis of the operational condition of rotating equipment by reference to vibration and other condition monitoring data and to refer this information to common failure conditions.
- ILO 5. Effectively apply theories and software to the evaluation and determination of fatigue and fracture mechanics of engineering materials and structures.
- ILO 6. Demonstrate knowledge of some key structural analysis techniques, including numerical methods and effectively apply these to analyse a range of structural problems.

### **B. PgDip in Design of Rotating Machines**

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

- ILO 5. Apply effectively mechanical transmission techniques and theories in support of the selection, design and evaluation of a range of technically significant gearing equipment.
- ILO 6. Apply and critically evaluate key technical management principles, including project management, people management, technology marketing, product development and finance.
- ILO 7. Integrate knowledge, understanding and skills from the taught modules in a real-life situation to address problems faced by industrial clients; creating new problem diagnoses, designs, or system insights; and communicating findings in a professional manner in written, oral and visual forms.

### **C. MSc in Design of Rotating Machines**

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

- ILO 8. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought
- ILO 9. To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences

## **4. How is the course taught?**

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

The taught elements of the course comprising lectures, assignments and other forms of coursework are delivered and concluded in the first half of the academic year. Lecture

programmes are assessed by continuous assessment (project reports, assignments, etc.) and/or formal written examinations.

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

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

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

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

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

### A. Postgraduate Certificate

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

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

### B. Postgraduate Diploma

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

Description	Credits
<b>COMPULSORY MODULES:</b>	



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

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

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  $\geq 50\%$ ;
- An average mark of  $\geq 50\%$  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);<sup>3 4</sup>
- **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  $\geq 50\%$  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  $\geq 40$  credits, which are not part of the taught assessment average), the pass mark of  $\geq 50\%$  (where they exist);
- **For the thesis**, a mark of  $\geq 50\%$  in order to receive a pass (where it exists).

## 6. How is the course structured?

Full-time students register for the course in October and are expected to complete the course within 12 calendar months. Part-time students can register at any point during the taught phase of the course although it is suggested that they do so within the initial months of the academic year.

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

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<sup>3</sup> 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).

<sup>4</sup> 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Minimum Mark <sup>7</sup> - 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 <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
2	N-DRM-BD	Bearing Design	J Amaral Teixeira	40		10	N		15/10/18	19/10/18	40	EX	100				w/c 07/01/19	Sept 19
3	N-DRM-GD	Gear Design	J Amaral Teixeira	30		10	N		25/03/19	28/03/19	40	ICW	100				27/04/19	Sept 19
4	N-DRM-RD	Rotor Dynamics	J Amaral Teixeira	50		10	N	A18	19/11/18 & 28/01/19	23/11/18 & 01/02/19	40	EX	100				w/c 18/02/19	Sept 19

<sup>5</sup> Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

<sup>6</sup> Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

<sup>7</sup> 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  $\geq 50\%$ . This will be at the Board of Examiners discretion.

<sup>8</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>9</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>10</sup> 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.

<sup>11</sup> 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; IPRACT – Individual Practical; 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Minimum Mark <sup>7</sup> - 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 <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
5	N-DRM-RESS	Rotating Equipment Systems and Selection	J Amaral Teixeira	35		10	N		04/02/19	08/02/19	40	ICW	100				PT 16/02/19	July 19
6	N-AME-ESA	Engineering Stress Analysis: Theory and Simulations	A Mehmanparas t	32		10	Y		12/11/18	16/11/18	40	ICW	100				PT 15/12/18	July 19
7	N-AME-SI	Structural Integrity	A Mehmanparas t	38.5		10	Y		14/01/19	18/01/19	40	EX	100				w/c 18/02/19	Sept 19
8	G-MTI Occ A	Management for Technology	R Adams	27		10	Y		11/02/19	15/02/19	40 40	EX	100				w/c 18/02/19	Sept 19
9	I-ENE-DISS Occ A	Dissertation (Part-Time option only)	G Drew	10		40	Y		01/10/18	30/09/19	50	I PROJ IPRES	80 20				27/09/19	
10	I-ENE-THESIS Occ A	Energy Individual Research Project	G Drew	20		80	Y		06/05/19	06/09/19	50 50	OR THESIS	10 90				02/09/19	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPAC – Individual Practical; GPRAC – Group Practical; I PROJ – Individual Project (>20 credits); G PROJ – 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.

<u>Module code</u>	<u>Module title</u>	<u>Course that owns the module</u>	<u>Course(s)/programme(s) that share the module</u>
N-AME-SI	Structural Integrity	Advanced Mechanical Engineering	<ul style="list-style-type: none"> <li>• Offshore Engineering</li> <li>• Renewable Energy</li> <li>• Design of Rotating Machines</li> <li>• REMS EngD</li> </ul>
N-AME-ESA	Engineering Stress Analysis: Theory and Simulations	Advanced Mechanical Engineering	<ul style="list-style-type: none"> <li>• Offshore Engineering</li> <li>• Renewable Energy Engineering</li> <li>• Design of Rotating Machines</li> <li>• REMS EngD</li> </ul>
G-MTI	Management for Technology	School of Management	<ul style="list-style-type: none"> <li>• Advanced Mechanical Engineering</li> <li>• REMS EngD</li> <li>• Design of Rotating Machines</li> <li>• Food Chain Systems</li> <li>• Offshore Engineering</li> <li>• Renewable Energy</li> <li>• Energy Systems and Thermal Processes</li> <li>• Process Systems Engineering</li> <li>• Advanced Chemical Engineering</li> </ul>

## 7. How are the ILOs assessed?

The following assessment types are utilised:

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

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

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

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

### Assessment and ILO Mapping

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

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

#### A. PgCert

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

#### B. PgDip

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

Award ILOs Module No.	ILO 7.	ILO 8.	ILO 9
3	ICW		
9		EX GCW	
10		IPROJ IPRES	IPROJ IPRES

#### C. MSc

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

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

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

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

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

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

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

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

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

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

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

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

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

New Partnership arrangements are considered in two stages:

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

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

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

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

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



## **COURSE SPECIFICATION**



### **Cranfield University: Course Specifications**

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

**COURSE TITLE:** Design Thinking

**Date of first publication/latest revision:** 20/03/2018

#### **1. What is the course?**

##### **Course information**

<b>Course Title</b>	Design Thinking
<b>Course code</b>	MNDETFTC, MNDETPTC, PDETFCTC, PDEETPTC, PCDETFTC, PCDETPTC
<b>Academic Year</b>	2018/19
<b>Valid entry routes</b>	MDes, PgDip, PgCert
<b>Additional exit routes</b>	PgDip, PgCert
<b>Mode of delivery</b>	Full time, Part time
<b>Location(s)<sup>1</sup> of Study</b>	Cranfield campus
<b>School(s)</b>	SWEE
<b>Theme</b>	Water
<b>Centre</b>	Centre for Competitive Creative Design (C4D)
<b>Course Director</b>	Dr Matt Collins
<b>Awarding Body</b>	Cranfield University
<b>Is this an AP Contract course?<sup>2</sup></b>	N/A
<b>Teaching Institution</b>	Cranfield University
<b>Admissions body</b>	Cranfield University
<b>Entry requirements</b>	Standard University entry requirements
<b>UK Qualifications Framework Level</b>	QAA FHEQ Level 7 (Masters))
<b>Benchmark Statement(s)</b>	N/A
<b>Registration Period(s) available</b>	MSc: 1 Year FT 3 Years PT

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

<sup>2</sup> 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 Centre for Competitive Creative Design (C4D) where the research interests include:

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

Communities of practise include:

- Break-through Innovation
- Materials Innovation
- Circular Innovation
- Data Driven Innovation

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

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

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

**Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)**

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

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

This course aims to:

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

This programme is intended for the following range of students:

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

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

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

### **A. Postgraduate Certificate in Design Thinking**

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

- ILO 1. Apply state-of-the-art design tools and processes, to create product and/ or service innovations.
- ILO 2. Evaluate the role of design thinking to make formative decisions for industrial competitiveness.
- ILO 3. Analyse and deconstruct complex innovation challenges, through best practice design methodologies, to problem solve and facilitate product, service or other innovations.

### **B. Postgraduate Diploma in Design Thinking**

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

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

### **C. MDes in Design Thinking**

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

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

## **4. How is the course taught?**

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

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

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

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

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

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

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

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

### A. **Postgraduate Certificate**

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

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

### B. **Postgraduate Diploma**

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Induction Week	0
Consumer Trends	20
Design, Technology & Prototyping	20
Whole System Design	10
Creative Enterprise & Entrepreneurship	20
Project Management Introduction	10
Group Project (Full Time Students)	40
<b>ELECTIVE MODULES:</b>	
Part Time Students:	

Group Project OR Dissertation	40
<b>TOTAL:</b>	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
<b>COMPULSORY MODULES:</b>	
Induction Week	0
Consumer Trends	20
Design, Technology & Prototyping	20
Whole System Design	10
Creative Enterprise & Entrepreneurship	20
Project Management Introduction	10
Group Project (Full Time Students)	40
Individual Thesis Project	80
<b>ELECTIVE MODULES:</b>	
Part Time Students:	
Group Project OR Dissertation	40
<b>TOTAL:</b>	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  $\geq 50\%$ ;
- An average mark of  $\geq 50\%$  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);<sup>3 4</sup>

<sup>3</sup> 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).

<sup>4</sup> Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of  $< 40\%$  (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a

- **For Taught Assessments**, the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of  $\geq 50\%$  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  $\geq 40$  credits, which are not part of the taught assessment average), the pass mark of  $\geq 50\%$  (where they exist);
- **For the thesis**, a mark of  $\geq 50\%$  in order to receive a pass (where it exists).

## 6. How is the course structured?

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

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

The full time course is structured in three phases:

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

The part time course is structured in three phases:

The taught phase between October and January taking five compulsory modules (typically within the registration period) over years one and two;  
 The dissertation phase is organised with a supervisor and typically delivered between years one and two;  
 The thesis project phase is delivered with a supervisor during year three.

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student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award ( $< 50\%$ ).

## Course modules

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

Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup> (%)	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
1	I-DES-INWK	Induction week	A Encinas-Oropesa	30		0	N		01/10/18	05/10/18	N/A	AO	N/A				N/A	N/A
2	I-DSL-A1021	Consumer Trends	M Moreno	70		20	N		08/10/18	19/10/18	40			100	GPRES RP	75 25	FT & PT - 19/10/2018 FT - 26/10/2018 PT – 09/11/2018	June 2019

<sup>5</sup> Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

<sup>6</sup> Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

<sup>7</sup> 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  $\geq 50\%$ . This will be at the Board of Examiners discretion.

<sup>8</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>9</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>10</sup> 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.

<sup>11</sup> Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

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

Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup> (%)	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
3	I-DES-DTP	Design, Technology & Prototyping	M Collins	70		20	N		05/11/18	16/11/18	40	IPRAC ICW	40 60				FT/PT – 30/11/2018  FT - 01/12/2018 PT – 15/12/2018	June 2019
4	I-DFS-A1028	Whole System Design	F Charnley	37		10	Y		03/12/18	07/12/18	40	ICW	100				FT - 15/12/2018 PT – 07/01/2019	June 2019
5	I-ICI-A1009	Creative Enterprise & Entrepreneurship	L Williams	80		20	N		07/01/19	18/01/19	40	GCW ICW	60 40				FT/PT – 18/01/2019  FT - 26/01/2019 PT – 09/02/2019	June 2019
6	M-L/PMI	Project Management Introduction	J Algar	20		10	Y		28/01/19	01/02/19	40			100	GCW1 GCW2 GCW3	10 60 30	FT/PT – 09/02/2019	September 2019
7	I-DES-GRPP	Group Project	M Collins	16		40	N		18/02/19	03/05/19	50	GPROJ ICW	80 20				30/04/2019 04/05/2019	

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



Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup> (%)	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
8	I-DES-DISS	Dissertation (PT students only)	M Collins	10		40	N		01/10/18	27/09/19	50	IPROJ IPRES	80 20				27/09/2019	
9	I-DES-THESIS	Individual Thesis Project	A Encinas-Oropesa	20		80	N		06/05/19	06/09/19	50	THESIS OR	90 10				02/09/2019	Sept 2020

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

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

<u>Module code</u>	<u>Module title</u>	<u>Course that owns the module</u>	<u>Other course(s)/ programme(s) that use the module</u>
M- L-PMI	Project Management Introduction	Logistics and Supply Chain Management	Design Thinking Procurement and Supply Chain Management Exec Logistics and Supply Chain Management
I-DFS-A1028	Whole System Design	Design Thinking	DTC in Sustainable Manufacture and Materials

## 7. How are the ILOs assessed?

The following assessment types are utilised:

Group Presentations, Individual Presentations, Reflective Portfolios, Group Practicals, Individual Practicals, Individual Coursework, Group Coursework, Group Project, Individual Thesis, Formative Assessments

This approach has been adopted because:

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

## Assessment and ILO Mapping

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

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

### A. Postgraduate Certificate in Design Thinking

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

## B. Postgraduate Diploma in Design Thinking

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

<b>Award ILOs Module No.</b>	ILO1	ILO2	ILO3	ILO4	
2	GPRES RP		GPRES RP		
3	IPRAC	ICW			
4	ICW	ICW	ICW		
5	GCW ICW		GCW ICW		
6	GCW		GCW		
7				GPROJ ICW	
8				IPROJ IPRES	

## C. Masters of Design in Design Thinking

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

<b>Award ILOs Module No.</b>	ILO5	ILO6			
10	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?**

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

## **COURSE SPECIFICATION**



### **Cranfield University: Course Specifications**

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

**COURSE TITLE:** MSc in Energy Systems and Thermal Processes

**Date of first publication/latest revision:** 21/06/18

#### **1. What is the course?**

##### **Course information**

<b>Course Title</b>	Energy Systems and Thermal Processes
<b>Course code</b>	MSESPFTC, MSEPPTC, PDESPFTC, PDESPPTC, PCESPFTC, PCESPPTC (UK) MSESOFTC, MSESOPPTC (Muscat)
<b>Academic Year</b>	2018/19
<b>Valid entry routes</b>	MSc, PgDip PgCert Muscat - MSc
<b>Additional exit routes</b>	PgDip, PgCert
<b>Mode of delivery</b>	Full-Time, Part-Time
<b>Location(s)<sup>1</sup> of Study</b>	Cranfield and Muscat
<b>School(s)</b>	School of Water, Energy and Environment
<b>Theme</b>	Energy & Power
<b>Centre</b>	Centre for Clean Power Engineering
<b>Course Director</b>	Dr Dawid P. Hanak
<b>Awarding Body</b>	Cranfield University
<b>Is this an AP Contract course?<sup>2</sup></b>	No
<b>Teaching Institution</b>	Cranfield University
<b>Admissions body</b>	Cranfield University
<b>Entry requirements</b>	Standard University entry requirements
<b>UK Qualifications Framework Level</b>	QAA FHEQ Level 7 (Masters)
<b>Benchmark</b>	Not Applicable

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

<sup>2</sup> AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

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

### **Institutions delivering the course**

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

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

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

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

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

### **Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)**

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

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

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

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

This programme is intended for the following range of students:

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

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

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

#### **A. Postgraduate Certificate in Energy Systems and Thermal Processes**

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

- ILO 1. Critically evaluate the current concepts and theories governing energy flows, heat transfer and energy conversion.
- ILO 2. Debate the technical, economic and environmental issues involved in power generation, the management of energy in industry and commerce and the design of energy-efficient systems and processes.
- ILO 3. Effectively analyse complicated energy systems/thermal processes and in order to achieve a cost-effective conservation of energy.
- ILO 4. Design and implement appropriate modelling studies using a range of software employed in fluid flow and heat transfer analyses, system and process modelling, the design of process-control systems and energy management.

#### **B. Postgraduate Diploma in Energy Systems and Thermal Processes**

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

- ILO 5. Demonstrate an ability to apply and critically evaluate key technical management principles, including project management, people management, technology marketing, product development and finance.
- ILO 6. Integrate knowledge, understanding and skills from the taught modules in a real-life situation to address problems faced by industrial clients; creating new problem diagnoses, designs, or system insights; and communicating findings in a professional manner in written, oral and visual forms.



### C. MSc in Energy Systems and Thermal Processes

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

- ILO 7. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought.
- ILO 8. To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences.

#### 4. How is the course taught?

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

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

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

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

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

##### A. **Postgraduate Certificate (PgCert)**

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Induction	0
Heat Transfer	10
Heat and Power Generation Systems	10
Thermal Systems Operation and Design	10
Management for Technology	10
<b>ELECTIVE MODULES:</b>	
A maximum of 2 modules from:	
Computational Fluid Dynamics for Industrial Processes	10
Advanced Control Systems	10
Process Measurement Systems	10

Process Design Simulation	10
Energy Systems Case studies	10
<b>TOTAL:</b>	<b>60</b>

#### B. Postgraduate Diploma (PgDip)

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Induction	0
Heat Transfer	10
Computational Fluid Dynamics for Industrial Processes	10
Heat and Power Generation Systems	10
Thermal Systems Operation and Design	10
Process Design and Simulation	10
Management for Technology	10
Group Project	40
<b>ELECTIVE MODULES:</b>	
2 modules from:	20 (10 credits for each module)
Advanced Control Systems	10
Energy Systems Case studies	10
Process Measurement Systems	10
Part Time Students:	
Group Project	40
OR	
Dissertation	40
<b>TOTAL:</b>	<b>120</b>

#### 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
<b>COMPULSORY MODULES:</b>	
Induction	0
Heat Transfer	10
Computational Fluid Dynamics for Industrial Processes	10
Heat and Power Generation Systems	10
Thermal Systems Operation and Design	10
Process Design and Simulation	10
Management for Technology	10
Group Project	40
Individual research project	80
<b>ELECTIVE MODULES:</b>	

2 modules from:	20 (10 credits for each module)
Advanced Control Systems	10
Energy Systems Case studies	10
Process Measurement Systems	10
Part Time Students:	
Group Project	40
OR	
Dissertation	40
<b>TOTAL:</b>	<b>200</b>

## D MSc (in Muscat)

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

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

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  $\geq 50\%$ ;
- An average mark of  $\geq 50\%$  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);<sup>3 4</sup>

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

## 6. How is the course structured?

Full-time students register for the course in September (Muscot) 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.

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<sup>3</sup> 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).

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

## Course modules

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

Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
1	I-ENE-INWK Occ A	Induction	P Clough	24		0	Y		01/10/18	05/10/18		AO					N/A	
2	N-PSE-HT Occ A	Heat Transfer	G Leeke	30		10	Y		15/10/18	19/10/18	40	EX	100				w/b 07/01/19	02-13/09/19
3	N-PSE-ACS	Advanced Control Systems	L Lao	30		10	Y		22/10/18	26/10/18	40	ICW	100				FT 03/11/18 PT 17/11/18	July 19

<sup>5</sup> Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

<sup>6</sup> Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

<sup>7</sup> 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  $\geq 50\%$ . This will be at the Board of Examiners discretion.

<sup>8</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>9</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>10</sup> 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.

<sup>11</sup> 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
	Occ A																	
4	N-PSE-CETIP Occ A	Computational Fluid Dynamics for Industrial Processes	P Verdin	30		10	Y		05/11/18	09/11/18	40	ICW	100				FT 24/11/18 PT 08/12/18	July 19
5	N-PSE-TSOD Occ A	Thermal Systems Operation and Design	A Nabavi	30		10	Y		26/11/18	30/11/18	40	EX	100				02-11/01/19	02-13/09/19
6	N-PSE-PSD	Process Design and Simulation	D Hanak	30		10	Y		10/12/18	14/12/18	40	ICW	100				FT 22/12/18 PT 05/01/19	July 19
7	N-PSE-PMS Occ A	Process Measurement Systems	L Lao	30		10	Y		14/01/19	18/01/19	40	ICW	100				FT 26/01/19 PT 09/02/19	July 19
8	N-PSE-PGRES Occ A	Heat and Power Generation Systems	K Patchigolla	30		10	Y		28/01/19	01/02/19	40	ICW	100				FT 09/02/19 PT 23/02/19	July 19
9	N-OFF-ESCS Occ A	Energy Systems Case Studies	S Wagland	32		10	Y		04/02/19	08/02/19	40			100	ICW GPRES	75 25	FT 02/03/19 PT 16/03/19 GPRES 08/02/19	July 19

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

Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
10	G-MTI Occ A	Management for Technology	R Adams	27		10	Y		11/02/19	15/02/19	40	EX	100				w/b 18/02/19	July 19
11	I-ENE-GRPP Occ A	Group Project	G Drew	16		40			25/02/19	03/05/19	50 50	GPROJ ICW	80 20				GPROJ 06/05/19 ICW 11/06/19	
12	I-ENE-DISS Occ A	Dissertation for part time students	G Drew	10		40			01/10/18	27/09/19	50	I PROJ IPRES	80 20				27/09/19	
13	I-ENE-THESIS Occ A	Energy Individual Research Project (IRP)	G Drew	20		80			06/05/19	06/09/19	50 50	OR THESIS	10 90				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

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

Module Number	Module code	Title	Module Leader	Contact hours <sup>12</sup>	Total hours delivered by Visiting Lecturers <sup>13</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>14</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>15</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>16</sup>	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>17</sup>	Assessment Submission and/or exam date <sup>18</sup>	Assessment / Exam Retake date
1	I-ENE-INWK Occ B	Induction	P Clough	24		0	Y		16/09/18	16/09/18		AO					N/A	
2	N-PSE-CETIP Occ B	Computational Fluid Dynamics for Industrial Processes	P Verdin	30		10	Y		23/09/18	27/09/18	40	ICW	100				FT 06/10/18 PT 20/10/18	
3	N-PSE-PMS Occ B	Process Measurement Systems	L Lao	30		10	Y		14/10/18	18/10/18	40	ICW	100				FT 27/10/18 PT	

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

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

<sup>14</sup> 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  $\geq 50\%$ . This will be at the Board of Examiners discretion.

<sup>15</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>16</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>17</sup> 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.

<sup>18</sup> 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 <sup>12</sup>	Total hours delivered by Visiting Lecturers <sup>13</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	Residential' Start Date	Residential' End Date	Minimum Mark 14 - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>15</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>16</sup>	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>17</sup>	Assessment Submission and/or exam date <sup>18</sup>	Assessment / Exam Retake date
																	10/11/18	
4	N-PSE-PGRE S Occ B	Heat and Power Generation Systems	K Patchigolla	30		10	Y		28/10/18	01/11/18	40	ICW	100				FT 10/11/18 PT 24/11/18	
5	N-PSE-HT Occ B	Heat Transfer	G Leeke	30		10	Y		11/11/18	15/11/18	40	EX	100				W/B 06/01/19	
6	N-PSE-ACS Occ B	Advanced Control Systems	L Lao	30		10	Y		25/11/18	29/11/18	40	ICW	100				FT 08/12/18 PT 22/12/18	
7	N-PSE-TSOD Occ B	Thermal Systems Operation and Design	A Nabavi	30		10	Y		16/12/18	20/12/18	40	EX	100				W/B 06/01/19	
8	N-OFF-ESCS Occ B	Energy Systems Case Studies	S Wagland	32		10	Y		20/01/19	24/01/19	40			100	ICW GPR ES	75 25	ICW FT 02/02/19 PT 16/02/19 GPRES	

Assessment Types: AO- Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; 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 <sup>12</sup>	Total hours delivered by Visiting Lecturers <sup>13</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>14</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>15</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>16</sup>	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>17</sup>	Assessment Submission and/or exam date <sup>18</sup>	Assessment / Exam Retake date
																	24/01/19	
9	G-MTI Occ C	Management for Technology	R Adams	27		10	Y		03/02/19	07/02/19	40	EX	100				W/B 24/02/19	
10	I-ENE-GRPP Occ B	Group Project	G Drew	16		40			25/02/19	03/05/19	50 50	GPROJ ICW	80 20				GPROJ 06/05/19 ICW 11/05/19	
11	I-ENE-DISS Occ B	Dissertation for part time students	G Drew	10		40			01/10/18	27/09/19	50	IPROJ IPRES	80 20				27/09/19	
12	I-ENE-THESIS Occ B	Energy Individual Research Project (IRP)	G Drew	20		80			06/05/18	05/09/19	50 50	OR THESIS	10 90				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.

<b><u>Module code</u></b>	<b><u>Module title</u></b>	<b><u>Course that owns the module</u></b>	<b><u>Other course(s)/ programme(s) that use the module</u></b>
N-PSE-ACS	Advanced Control Systems	Process Systems Engineering	<ul style="list-style-type: none"> <li>• Advanced Mechanical Engineering</li> <li>• Advanced Chemical Engineering</li> <li>• Advanced Chemical Engineering General Route.</li> <li>• Energy Informatics</li> <li>• Energy Systems and Thermal Processes</li> <li>• Process Systems Engineering ( including Muscat)</li> <li>• Renewable Energy Marine Structures EngD</li> </ul>
N-PSE-CETIP	Computational Fluid Dynamics for Industrial Processes	Process Systems Engineering	<ul style="list-style-type: none"> <li>• Energy Informatics</li> <li>• Energy Systems and Thermal Processes</li> </ul>
N-PSE-PMS	Process Measurement Systems	Process Systems Engineering	<ul style="list-style-type: none"> <li>• Energy Informatics</li> <li>• Atmospheric Emissions Technology</li> <li>• Energy Systems and Thermal Processes</li> </ul>
N-PSE-TSOD	Thermal Systems Operation and Design	Process Systems Engineering	<ul style="list-style-type: none"> <li>• Energy Systems and Thermal Processes</li> <li>• Advanced Chemical Engineering General Route</li> </ul>
N-PSE-PGRES	Heat and Power Generation Systems	Energy Systems and Thermal Processes	<ul style="list-style-type: none"> <li>• Advanced Mechanical Engineering</li> <li>• Energy Informatics</li> </ul>
N-OFF-ESCS	Energy Systems Case Studies	Offshore Engineering	<ul style="list-style-type: none"> <li>• Energy Informatics</li> <li>• Energy Systems and Thermal Processes</li> <li>• Renewable Energy</li> <li>• REMS EngD</li> </ul>
G-MTI	Management for Technology	School of Management	<ul style="list-style-type: none"> <li>• Advanced Mechanical Engineering</li> <li>• REMS EngD</li> <li>• Food Chain Systems</li> <li>• Offshore Engineering</li> <li>• Renewable Energy</li> <li>• Energy Systems and Thermal Processes</li> <li>• Process Systems</li> </ul>

			Engineering <ul style="list-style-type: none"> <li>Advanced Chemical Engineering</li> <li>Energy Informatics</li> </ul>
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## 7. How are the ILOs assessed?

The following assessment types are utilised:

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

This approach has been adopted in order to:

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

### Assessment and ILO Mapping

#### A. Postgraduate Certificate in Energy Systems and Thermal Processes

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

#### B. Postgraduate Diploma in Energy Systems and Thermal Processes

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

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

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

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

Award ILOs Module No.	7	8
3	THESIS OR	THESIS OR

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

Award ILOs Module No.	1	2	3	4	5	6	7	8
2	ICW	ICW	ICW					
3	ICW	ICW	ICW	ICW				
4	ICW	ICW	ICW					
5	EX	EX	EX					
6	ICW	ICW	ICW					
7	EX	EX	EX					
8	ICW GPRES	ICW GPRES	ICW GPRES	ICW GPRES				
9					EX			
10					GPROJ ICW	GPROJ ICW		
11					I PROJ IPRES	I PROJ IPRES		
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. What opportunities are graduates likely to have on completing the course?**

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

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

## **COURSE SPECIFICATION**



### **Cranfield University: Course Specifications**

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

**COURSE TITLE:** MSc in Engineering and Management of Manufacturing Systems

**Date of first publication/latest revision:** July 2018

#### **1. What is the course?**

##### **Course information**

<b>Course Title</b>	MSc in Engineering and Management of Manufacturing Systems
<b>Course code</b>	MSEMMFTC, MSEMMPTC, PDEMMFTC, PDEMMPTC, PCEMMFTC, PCEMMPTC
<b>Academic Year</b>	2018/19
<b>Valid entry routes</b>	MSc, PgDip, PgCert
<b>Additional exit routes</b>	PgDip, PgCert
<b>Mode of delivery</b>	Full-time, Part-time
<b>Location(s)<sup>1</sup> of Study</b>	Cranfield University
<b>School(s)</b>	School of Aerospace, Transport and Manufacturing
<b>Theme</b>	Manufacturing
<b>Centre</b>	Sustainable Manufacturing Systems Centre
<b>Course Director</b>	Professor Charalampos (Harris) Makatsoris
<b>Awarding Body</b>	Cranfield University
<b>Is this an AP Contract course?<sup>2</sup></b>	<b>No</b>
<b>Teaching Institution</b>	Cranfield University
<b>Admissions body</b>	Cranfield University
<b>Entry requirements</b>	Standard University entry requirements
<b>UK Qualifications Framework Level</b>	QAA FHEQ Level 7 (Masters)
<b>Benchmark Statement(s)</b>	Not Applicable
<b>Registration Period(s)</b>	Full-time MSc - one year, Part-time MSc - up to three years, Full-time

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

<sup>2</sup> AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract



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

### **Institutions delivering the course**

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

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

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

### **Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)**

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

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

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

Cranfield University offers this course in order to:

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

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

This programme is intended for the following range of students:

- Those wishing to work nationally or internationally with manufacturing companies that need to address manufacturing systems problems.
- Those wishing to work in manufacturing and operations management consultancy.

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

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

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

#### **A. Postgraduate Certificate**

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

- ILO 1. Develop and demonstrate a systematic understanding and critical awareness of a manufacturing enterprise functions including manufacturing systems, management accounting, human resource management, and strategy development.
- ILO 2. Demonstrate a comprehensive understanding of techniques needed for credible manufacturing system design and improvement projects.
- ILO 3. Show originality in application of in-depth knowledge of manufacturing operations development and critically evaluate the appropriate applications of methodologies.
- ILO 4. Critically evaluate theories for the analysis and design tools and their application to (a) solve manufacturing problems in terms of technology and/or organisations and (b) increase the effectiveness of manufacturing systems.
- ILO 5. Demonstrate transferable skills including, personal responsibility, complex decision making and independence for further learning.
- ILO 6. Develop a sound theoretical approach to critically evaluate data and information, undertaking a critical appraisal of technical and/or commercial literature.
- ILO 7. Demonstrate the ability to apply practical and rigorous approaches to identify projects, develop engineering solutions and evaluate their effectiveness.
- ILO 8. Propose and bring about improvements to appropriate business standards.

#### **B. Postgraduate Diploma**

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

- ILO 9. Deal with complex problems and communicate effectively the results of group project/dissertation to specialist and non-specialist audiences, both orally and in writing.
- ILO 10. Demonstrate ability to provide technical and commercial leadership through planning industrial/research projects (budgets, people, tasks) and contributing to teams delivering under time pressures individually and as a team member.

#### **C. MSc**

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

- ILO 11. Demonstrate independent and original research on a subject relevant to manufacturing system development and management involving project planning, development of new skills, critical evaluation of results and discussion of findings using methodologies that show further knowledge and understanding in future work.
- ILO 12. Engage in innovative developments to select appropriate technologies and methodologies to suit particular projects.

### **4. How is the course taught?**

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

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

All MSc students undertake a Group Project (full time students) or produce a Dissertation (part time students). The Group projects are group-based activities typically undertaken for 12 weeks between February and April (August and October for March intake). The projects are designed to integrate knowledge, understanding and skills from the taught modules in a real-life situation. The Group Project will typically involve a team of students between 5 and 8, working to investigate a manufacturing opportunity or solve a manufacturing problem. For part-time students, a Dissertation replaces the Group Project. The topic is to be agreed between the University and the student.

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

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

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

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

### A. **Postgraduate Certificate**

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

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

### B. **Postgraduate Diploma**

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

Description	Credits
<b>COMPULSORY MODULES:</b>	

Modules 2-9	80
Group Project for full-time students (10a) or Dissertation for part-time students (10b)	40
<b>ELECTIVE MODULES:</b>	
None	
<b>RECOMMENDED MODULE:</b>	
Induction	0
<b>TOTAL:</b>	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
<b>COMPULSORY MODULES:</b>	
Modules 2-9	80
Group Project for full-time students (10a) or Dissertation for part-time students (10b)	40
Individual Research Project (11)	80
<b>ELECTIVE MODULES:</b>	
None	
<b>RECOMMENDED MODULE:</b>	
Induction	0
<b>TOTAL:</b>	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  $\geq 50\%$ ;
- An average mark of  $\geq 50\%$  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);<sup>3 4</sup>

<sup>3</sup> 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).

<sup>4</sup> Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of  $< 40\%$  (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a

- **For Taught Assessments**, the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of  $\geq 50\%$  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  $\geq 40$  credits, which are not part of the taught assessment average), the pass mark of  $\geq 50\%$  (where they exist);
- **For the thesis**, a mark of  $\geq 50\%$  in order to receive a pass (where it exists).

## 6. How is the course structured?

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

This course is also offered on a part-time basis. In such a situation, students typically complete the various components of the course over two or three years. Typical case is to complete four taught modules plus a Dissertation in year 1 and the remainder of the modules plus the Thesis in year two and/or year 3.

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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.

### October Intake

Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	‘ Residential’ Start Date	‘ Residential’ End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
1	I-MAN-INWK	Induction	Dr Konstantinos Salonitis	23		0	Y		25/09/18	29/09/18	N/A	AO	N/A				N/A	
2	I-MNU-A1034	Operations Management	Prof Charalampos (Harris) Makatsoris	32		10	Y		01/10/18	05/10/18	40	EX	100				26/10/18	September 2019

<sup>5</sup> Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

<sup>6</sup> Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

<sup>7</sup> 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  $\geq 50\%$ . This will be at the Board of Examiners discretion.

<sup>8</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>9</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>10</sup> 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.

<sup>11</sup> 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
3	I-MNU-A1031	Enterprise Systems	Dr Essam Shehab	32		10	Y		15/10/18	19/10/18	40	EX	100				wc 10/12/18	September 2019
4	I-MNU-A1029	Operations Analysis	Dr Konstantinos Salonitis	32	8	10	Y		29/10/18	02/11/18	40	EX	100				wc 10/12/18	September 2019
5	I-MNU-A1018	General Management	Mr Matthew Caffrey	32		10	Y		19/11/18	23/11/18	40	EX	100				Wc 02/01/19	September 2019
6	I-MNU-A1027	Manufacturing Systems Engineering	Prof Charalampos (Harris) Makatsoris	32		10	Y		12/11/18	16/11/18	40	ICW	100				FT07/12/18 PT21/12/18	Re-assessment date to be set by agreement of Course Director and Module Leader as/when required
7	I-MNU-A1021	Management of Technology and Innovation	Dr Leon Williams	32		10	N		03/12/18	07/12/18	40	ICW	100				FT11/01/19 PT25/01/19	Re-assessment date to be set by agreement of Course Director and Module Leader as/when required
8	I-MNU-A1038	Supply Chain Management	Dr Ahmed Al-Ashaab	32		10	Y		14/01/19	18/01/19	40	ICW	100				FT08/02/19 PT22/02/19	Re-assessment date to be set by agreement of Course Director

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

Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
																19	and Module Leader as/when required	
9	I-MNU-A1019	Manufacturing Strategy	Dr Patrick McLaughlin	35		10	Y		21/01/19	25/01/19	40			100 MULTI	GPRES GCW ICW	30 50 20	FT15/02/19 PT01/03/19	Re-assessment date to be set by agreement of Course Director and Module Leader as/when required
10a	I-MAT-GRPP	Group Project for Full Time Students	Dr David Ayre	20		40	Y		04/02/19	26/04/19	50			80 MULTI  20 MULTI	GPRES GPROJ  ICW observed behaviour	16 64  10 10	08/05/19 30/04/19  30/04/19	
10b	I-MAT-DISS	Dissertation for Part Time Students	Dr Konstantinos Salonitis	20		40	Y		01/02/19	30/08/19	50	ICW	100				02/09/19	
11	I-MNU-THESIS	Individual Research Project	Dr Muhammed Khan	20		80	Y		29/04/19	06/09/19	50	THESIS OR	90 10				30/08/19 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



## March Intake – Not Running

Module Number	Module code	Title	Module Leader	Contact hours <sup>12</sup>	Total hours delivered by Visiting Lecturers <sup>13</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>14</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>15</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>16</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>17</sup>	Assessment Submission and/or exam date <sup>18</sup>	Assessment / Exam Retake date
1	I-MAN-INWK	Induction	Dr Konstantinos Salonitis	22		0	Y				N/A	AO	N/A					
2	I-MNU-A1034	Operations Management	Prof Charalampos (Harris) Makatsoris	32		10	Y				40	EX	100					
3	I-MNU-A1031	Enterprise Systems	Dr Essam Shehab	32		10	Y				40	EX	100					
4	I-MNU-A1029	Operations Analysis	Dr Konstantinos Salonitis	32	8	10	Y				40	EX	100					

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

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

<sup>14</sup> 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  $\geq 50\%$ . This will be at the Board of Examiners discretion.

<sup>15</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>16</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>17</sup> 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.

<sup>18</sup> 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 <sup>12</sup>	Total hours delivered by Visiting Lecturers <sup>13</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment								
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>14</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates		
												Type of Assessment	Weighting within module <sup>15</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>16</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>17</sup>	Assessment Submission and/or exam date <sup>18</sup>	Assessment / Exam Retake date	
5	I-MNU-A1018	General Management	Mr Matthew Caffrey	32		10	Y				40	EX	100						
6	I-MNU-A1027	Manufacturing Systems Engineering	Prof Charalampos (Harris) Makatsoris	32		10	Y				40	ICW	100						
7	I-MNU-A1021	Management of Technology and Innovation	Dr Leon Williams	32		10	N				40	ICW	100						
8	I-MNU-A1038	Supply Chain Management	Dr Ahmed Al-Ashaab	32		10	Y				40	ICW	100						
9	I-MNU-A1019	Manufacturing Strategy	Dr Patrick McLaughlin	35		10	Y				40			100 MULTI	GPRES GCW ICW	30 50 20			
10a	I-MAT-GRPP	Group Project for Full Time Students	Dr David Ayre	20		40	Y				50			80 MULTI  20 MULTI	GPRES GPROJ  ICW observed behaviour	16 64  10 10			
10b	I-MAT-DISS	Dissertation for Part Time Students	Dr Konstantinos Salonitis	20		40	Y				50	ICW	100						

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

Module Number	Module code	Title	Module Leader	Contact hours <sup>12</sup>	Total hours delivered by Visiting Lecturers <sup>13</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>14</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>15</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>16</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>17</sup>	Assessment Submission and/or exam date <sup>18</sup>	Assessment / Exam Retake date
11	I-MNU-THESIS	Individual Research Project	Dr Muhammed Khan	20		80	Y				50	THESIS OR	90 10					

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; 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.

<b><u>Module code</u></b>	<b><u>Module title</u></b>	<b><u>Course that owns the module</u></b>	<b><u>Other course(s)/ programme(s) that use the module</u></b>
I-MAN-INWK	Induction	Engineering and Management of Manufacturing Systems	Management and Information Systems, Knowledge Management for Innovation (not currently running), Aerospace Manufacturing, Global Product Development and Management, Cyber-Secure Manufacturing
I-MNU-A1034	Operations Management	Engineering and Management of Manufacturing Systems	Manufacturing Technology and Management, Global Product Development and Management, Management and Information Systems, Aerospace Manufacturing, Cyber-Secure Manufacturing
I-MNU-A1031	Enterprise Systems	Management and Information Systems	Management and Information Systems, Knowledge Management for Innovation (not currently running)
I-MNU-A1029	Operations Analysis	Engineering and Management of Manufacturing Systems	Aerospace Manufacturing
I-MNU-A1018	General Management	Engineering and Management of Manufacturing Systems	Advanced Materials, Applied Nanotechnology, Manufacturing Technology and Management, Global Product Development and Management, Management and Information Systems, Knowledge Management for Innovation (not currently running)
I-MNU-A1027	Manufacturing Systems Engineering	Engineering and Management of Manufacturing Systems	Aerospace Manufacturing, Cyber-Secure Manufacturing
I-MNU-A1038	Supply Chain Management	Engineering and Management of Manufacturing Systems	Aerospace Manufacturing
I-MNU-A1019	Manufacturing Strategy	Engineering and Management of Manufacturing Systems	Aerospace Manufacturing
I-MAT-DISS	Dissertation for Part Time Students	Manufacturing Technology and Materials Programme	Advanced Materials, Aerospace Materials, Applied Nanotechnology, Manufacturing Technology and Management, Aerospace Manufacturing, Global Product Development and Management, Knowledge Management for Innovation (not

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

## 7. How are the ILOs assessed?

The following assessment types are utilised:

The course uses a range of assessment types. Students can expect to have four written examinations, four pieces of assessment by submitted work, one piece of group project work (including an assessment of personal contribution to group work), and one element assessed by a thesis and an oral presentation.

This approach has been adopted in order to perform formative and summative assessments of the students to demonstrate their ability in a range of contexts. Part time students will be assessed by dissertation in place of the group project.

### Assessment and ILO Mapping

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

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

#### A. Postgraduate Certificate

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

Award ILOs Module No.	ILO 1.	ILO 2.	ILO 3.	ILO 4.	ILO 5.	ILO 6.	ILO 7.	ILO 8
1	Non-assessed							
2	EX				EX			
3	EX	EX						
4		EX	EX	EX	EX		EX	EX
5	EX				EX			
6		ICW	ICW	ICW			ICW	ICW
7		ICW				ICW		
8	ICW				ICW	ICW		
9		ICW	ICW	ICW	ICW	ICW	ICW	ICW

## B. Postgraduate Diploma

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

Award ILOs Module No.	ILO 9.	ILO 10.
10a	GPRES GPROJ ICW	GPRES GPROJ ICW
10b	ICW	ICW

## C. MSc

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

Award ILOs Module No.	ILO 11.	ILO 12.
11	THESIS OR	THESIS OR

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

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

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

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

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

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

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

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

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

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

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

The intention of the course is to provide students with knowledge and understanding and associated transferrable skills to make a contribution to industry on graduation. Graduates will typically seek employment in manufacturing industry, consultancies or research institutions. Common starting roles are manufacturing engineer, industrial engineer, technical analyst, project manager and PhD researcher. With time (quicker for those with more background experience) graduates progress to senior positions with significant responsibility for people, budgets and projects.

## **COURSE SPECIFICATION**



### **Cranfield University: Course Specifications**

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

**COURSE TITLE:** MSc in Environmental Engineering

**Date of first publication/latest revision:** 05/03/18

#### **1. What is the course?**

##### **Course information**

<b>Course Title</b>	Environmental Engineering
<b>Course code</b>	MSEENFTC, MSEENPTC, PDEENFTC, PDEENPTC, PCEENFTC, PCEENPTC
<b>Academic Year</b>	2018/19
<b>Valid entry routes</b>	MSc, PgDip, PgCert
<b>Additional Exit routes</b>	PgDip, PgCert
<b>Mode of delivery</b>	Full-time, Part-time
<b>Location(s)<sup>1</sup> of Study</b>	Cranfield Campus
<b>School(s)</b>	School of Water, Energy and Environment
<b>Theme</b>	Environment & Agrifood
<b>Centre</b>	Institute for Resilient Futures
<b>Course Director</b>	Dr Mark Pawlett
<b>Awarding Body</b>	Cranfield University
<b>Is this an AP Contract course?<sup>2</sup></b>	No
<b>Teaching Institution</b>	Cranfield University
<b>Admissions body</b>	Cranfield University
<b>Entry requirements</b>	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
<b>UK Qualifications Framework Level</b>	QAA FHEQ Level 7 (Masters)

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

<sup>2</sup> AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract



<b>Benchmark Statement(s)</b>	N/A
<b>Registration Period(s) available</b>	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
<b>Course Start Month(s)</b>	Full-time: October Part-time: typically an October start

### **Institutions delivering the course**

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

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

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

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

### **Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)**

This course is accredited formally by the Chartered Institution of Water and Environmental Management (CIWEM) until September 2018 (reaccreditation for a further five years is being processed in the summer of 2018) and the Institution of Agricultural Engineers (IAgrE) until 2021.

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

Cranfield University offers these courses in order to:

Cover the application of scientific and engineering principles for the protection and improvement of environmental quality alongside protecting and enhancing quality of human life at both local and global scales. Specifically, the MSc will equip students with a set of knowledge and skills which will enable them to solve a wide range of environmental engineering problems including municipal and toxic waste management, process emissions, contaminated land and water and waste disposal. The programme will also address energy and resource recovery from waste materials.

On completion of the course an MSc graduate will be equipped to:

- Acquire an advanced theoretical and specialist understanding of processes and practices central to environmental engineering
- Select and apply appropriate existing and emerging technologies that can achieve lower environmental impact via an integrated and cross-disciplinary approach

- Enable the application of scientific, technical and engineering principles, economic consequences and risks of environmental management options as best practice
- Develop the capacity to undertake successful technical research projects using appropriate methods of critical analysis.

These courses are intended for the following range of students:

- graduates with science, engineering, geography or related degrees keen to pursue careers in environmental management or waste management
- graduates currently in employment keen to extend their qualifications or to pursue a career change
- individuals with other qualifications but who possess considerable relevant experience

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

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

##### **A. Postgraduate Certificate in Environmental Engineering**

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

- ILO 1. Describe the key processes operating in the natural environment and the general biological, physical and engineering principles that underpin relevant aspects of ecosystem function and natural environmental management.
- ILO 2. Critically evaluate the principal sources, risk and environmental impact of waste and pollution generation along with the importance of pollution control and the principles of sustainable energy and materials use.
- ILO 3. Critically evaluate sustainable environmental engineering concepts and principles in order to design practical environmental management solutions, taking into account social, environmental, technical, regulatory (including health and safety) and commercial constraints to a range of industrial and commercial contexts.

##### **B. Postgraduate Diploma in Environmental Engineering**

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

- ILO 4. Analyse sustainable environmental engineering solutions pertaining to environmental issues with the options of focusing on modelling or risk management.
- ILO 5. Integrate knowledge, understanding and skills from the taught modules in a real-life situation to address problems faced by industrial clients; creating new problem diagnoses, designs, or system insights; and communicating findings in a professional manner in written, oral and visual forms.

## **C. MSc in Environmental Engineering**

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

- ILO 6. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought
- ILO 7. To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences.

### **4. How is the course taught?**

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

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

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

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

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

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

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

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

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

#### **A. Postgraduate Certificate**

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

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

## B. Postgraduate Diploma

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

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

## 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
<b>COMPULSORY MODULES:</b>	
Induction Week	0
Environmental Risks: Hazard, Assessment and Management	10
Circular Waste Management: Recycle, Recover, and Dispose	20
Process Emissions and Control	10
Soil Erosion Control for Catchment Management	10
Pollution Prevention and Remediation Technologies	10
Group Project (Full Time Students)	40
Individual Thesis Project	80
<b>ELECTIVE MODULES:</b>	
One of:	
Risk Management and Reliability Engineering	10
Modelling Environmental Processes	10
AND	
One of:	
Land Engineering and Water Management	10
Evaluating Sustainability Through Life Cycle Approaches	10
Part Time Students:	
Group Project	40
OR	
Dissertation	40
<b>TOTAL:</b>	<b>200</b>

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  $\geq 50\%$ ;
- An average mark of  $\geq 50\%$  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);<sup>3 4</sup>

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

- **For Taught Assessments**, the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of  $\geq 50\%$  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  $\geq 40$  credits, which are not part of the taught assessment average), the pass mark of  $\geq 50\%$  (where they exist);
- **For the thesis**, a mark of  $\geq 50\%$  in order to receive a pass (where it exists).

## 6. How is the course structured?

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

All options are also offered on a part-time basis and such students are expected to complete the course within 2 to 3 years. Part-time students are not restricted to starting in October. Instead they are offered individual guidance on the best sequence of study based on their prior knowledge and availability to attend.

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

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<sup>4</sup> 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
1	I-ENV-INWK	Induction	T Brewer	33		0	Y		01/10/18	05/10/18	N/A	AO	N/A				N/A	
2	I-ERM-A2005	Environmental Risks: Hazard, Assessment and Management	S Jude	24.5		10	Y		08/10/18	12/10/18	40	ICW	100				FT - 20/10/18 PT - 03/11/18	July 19

<sup>5</sup> Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

<sup>6</sup> Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

<sup>7</sup> 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  $\geq 50\%$ . This will be at the Board of Examiners discretion.

<sup>8</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>9</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>10</sup> 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.

<sup>11</sup> 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
3	I-WRM-CRM	Circular Waste Management: Recycle, Recover & Dispose	R Villa	52		20	Y		22/10/18 05/11/18	26/10/18 09/11/18	40			100	ICW ICW	50 50	FT - 03/11/2018 PT - 17/11/2018 FT - 17/11/2018 PT - 01/12/2018	July 19
4	I-WSC-A1095	Risk Management and Reliability Engineering	J MacAdam	30		10	Y		19/11/18	23/11/18	40			100	GCW ICW	70% 30%	FT/PT 01/12/18	July 19
5	I-EI-A1001	Modelling Environmental Processes	J Meersmans	26		10	Y		19/11/18	23/11/18	40			100	IPRES ICW	60% 40%	IPRES - FT/PT Week comm: 26/11/18 ICW - FT 01/12/18 PT 15/12/18	July 19
6	I-LAM-A1145	Land Engineering & Water	L Deeks	30		10	Y		03/12/18	07/12/18	40	ICW	100				FT 15/12/18	July 19

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRACT – Individual Practical; 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment								
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates		
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date	
		Management															PT 05/01/19		
7	I-EDI-A1127	Evaluating Sustainability through life cycle approaches	A Williams	30		10	Y		03/12/18	07/12/18	40	ICW	100					FT 02/01/19 PT 12/01/19	July 19
8	I-IWM-A1500	Process Emissions and Control	I Mead	25		10	Y		07/01/19	11/01/19	40	ICW	100					FT - 19/01/19 PT - 02/02/19	July 19
9	I-LAM-A1523	Soil Erosion Control: Principles and Practices (FT)	R Simmons	40		10	Y		21/01/19	25/01/19	40			100	GCW ICW	50% 50%	GCW & ICW 09/02/19	July 19	
10	I-LAM-A1524	Soil Erosion Control: Principles and Practices (PT)	R Simmons	40		10	Y		21/01/19	25/01/19	40	ICW	100					23/02/2019	July 192018
11	I-IWM-A1061	Pollution Prevention and Remediation	F Coulon	29		10	N		04/02/19	08/02/19	40	ICW	100					FT - 16/02/19 PT -	July 19

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

Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
		Technologies															02/03/19	
12	I- ENV-GRPP	Group Project	Supervisors	16		40	Y		18/02/19	03/05/19	50	GPROJ ICW	80 20				GPROJ - 29/04/19 ICW - 04/05/19	
13	I-ENV-DISS	Dissertation (for part time students)	Supervisors	10		40	Y		01/10/18	27/09/19	50	I PROJ IPRES	80 20				27/09/19	
14	I-ENV-THESIS	Individual Research Project	Supervisors	20		80	Y		06/05/19	06/09/19	50	THESIS OR	90 10				02/09/19	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRACT – Individual Practical; GPRAC – Group Practical; I PROJ – 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.

<b><u>Module code</u></b>	<b><u>Module title</u></b>	<b><u>Course that owns the module</u></b>	<b><u>Other course(s)/ programme(s) that use the module</u></b>
I-WSC-A1095	Risk Management and Reliability Engineering	Water and Wastewater Engineering	<ul style="list-style-type: none"> <li>• Environmental Engineering</li> <li>• STREAM EngD</li> </ul>
I-IWM-A1500	Process Emissions and Control	Atmospheric Emission Technology	<ul style="list-style-type: none"> <li>• Environmental Engineering</li> </ul>
I-LAM-A1145	Land Engineering & Water Management	Land Reclamation and Restoration	<ul style="list-style-type: none"> <li>• Environmental Engineering</li> </ul>
I-LAM-A1523	Soil Erosion Control: Principles and Practices (Full Time Study)	Land Reclamation and Restoration	<ul style="list-style-type: none"> <li>• Environmental Engineering</li> </ul>
I-LAM-A1524	Soil Erosion Control: Principles and Practices (Part Time Study)	Land Reclamation and Restoration	<ul style="list-style-type: none"> <li>• Environmental Engineering</li> </ul>
I-EDI-A1127	Evaluating Sustainability Through Life Cycle Approached	Environmental Management for Business	<ul style="list-style-type: none"> <li>• Environmental Engineering</li> <li>• Advanced Chemical Engineering (Biorefining Route)</li> <li>• Cleantech Entrepreneurship</li> </ul>
I-EI-A1001	Modelling Environmental Processes	Environmental Water Management	<ul style="list-style-type: none"> <li>• Environmental Engineering</li> <li>• Geographical Information Management</li> </ul>
I-ERM-A2005	Environmental Risks: Hazard, Assessment, and Management	Environmental Engineering	<ul style="list-style-type: none"> <li>• REMS EngD</li> </ul>

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

The following assessment types are utilised:

- the taught modules (40%) are assessed by in-module assessment (including coursework, which focuses on application of principles studied and class tests, which support underpinning knowledge) or examination in January;
- group projects (20%) are assessed by means of a written group report and presentations.
- the research project (40%), is assessed by a thesis and an oral examination

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

## **Assessment and ILO Mapping**

### **A. Postgraduate Certificate in Environmental Engineering**

<b>Award ILOs</b> <b>Module No.</b>	ILO1	ILO2	ILO3
I-ERM-A2005	ICW	ICW	ICW
I-WRM-CRM		ICW	ICW
I-IWM-A1500		ICW	ICW
I-LAM-A1523	GCW/ ICW	GCW/ ICW	GCW/ ICW
I-IWM-A1061		ICW	ICW

## B. Postgraduate Diploma in Environmental Engineering

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

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

## C. Master of Science in Environmental Engineering

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

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

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

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

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

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

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

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

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

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

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

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

New Partnership arrangements are considered in two stages:

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

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

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

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

On completion, graduates have a broader network of global contacts, increased opportunities for individual opportunities and a wide range of careers as professional scientists and engineers in the environment sector.

Some of the employers over the last three years include:

- Golder Associates
- Arup
- Seche Environment
- EnvironTech GmbH
- Deloitte
- BP
- Chevron
- WSP
- Jacobs
- Viridor

### Cranfield University: Course Specifications

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

**COURSE TITLE:** MSc in Environmental Management for Business

**Date of first publication/latest revision:** 06/03/18

## 1. What is the course?

### Course information

<b>Course Title</b>	Environmental Management for Business
<b>Course code</b>	MSEMBFTC, MSEMBPTC, PDEMBFTC, PDEMBPTC, PCEMBFTC, PCEMBPTC
<b>Academic Year</b>	2018/19
<b>Valid entry routes</b>	MSc, PgDip, PgCert
<b>Additional Exit routes</b>	PgDip, PgCert
<b>Mode of delivery</b>	Full-time, Part-time
<b>Location(s)<sup>1</sup> of Study</b>	Cranfield
<b>School(s)</b>	School of Water, Energy and Environment
<b>Theme</b>	Environment & Agrifood
<b>Centre</b>	Cranfield Institute for Resilient Futures
<b>Course Director</b>	Dr David Parsons
<b>Awarding Body</b>	Cranfield University
<b>Is this an AP Contract course?<sup>2</sup></b>	No
<b>Teaching Institution</b>	Cranfield University
<b>Admissions body</b>	Cranfield University
<b>Entry requirements</b>	<p>This course is suitable for graduates with science, engineering, social science or business related degrees keen to pursue careers in resource management; or graduates currently working in industry keen to extend their qualifications; or individuals with other qualifications who possess considerable relevant experience.</p> <p>If you are an international student you will need to provide evidence that you have achieved a satisfactory test result in an English qualification. The minimum standard expected from a number of</p>

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

<sup>2</sup> AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

	accepted courses are as follows IELTS - 6.5, TOEFL – 92, Pearson PTE Academic – 65, Cambridge English Scale – 180, Cambridge English: Advanced – C, Cambridge English: Proficiency - C
<b>UK Qualifications Framework Level</b>	QAA FHEQ Level 7 (Masters)
<b>Benchmark Statement(s)</b>	N/A
<b>Registration Period(s) available</b>	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
<b>Course Start Month(s)</b>	Full-time: October Part-time: October

### **Institutions delivering the course**

This course is delivered by Cranfield Institute for Resilient Futures where the research interests include environmental risk analysis, life cycle analysis, ecosystem service assessment, environmental modelling and institutional resilience

### **Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)**

This course is accredited formally by the Chartered Institution of Water and Environmental Management (CIWEM) until September 2018.

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

Cranfield University offers this course:

- To provide students with the knowledge and understanding of environmental policy, and the ability to develop and implement strategies in response to those policies;
- To develop an understanding of Sustainable Development and the knowledge of related international, national and local government policies and frameworks, with particular emphasis on natural resources and the environment.
- To develop the capacity to undertake successful technical research projects using appropriate methods of critical analysis

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

This programme is intended for the following range of students:

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

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

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



## **A. Postgraduate Certificate in Environmental Management for Business**

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

- ILO 1. Critically analyse environmental issues and contribute to strategic and policy decision making processes in the private, public and NGO sectors at all levels
- ILO 2. Develop and implement feasible environmentally and socially responsible strategies and policies based on scientific evidence within the appropriate economic, legal and political frameworks
- ILO 3. Monitor and assess organisational practices and the outcomes of policies and strategies through the use of appropriate methods, such as environmental auditing

## **B. Postgraduate Diploma in Environmental Management for Business**

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

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

## **C. MSc in Environmental Management for Business**

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

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

## **4. How is the course taught?**

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

Teaching and learning methods aim to promote and develop the students as autonomous and reflective learners. This is achieved by providing a structured underpinning knowledge base which the students can test and expand by means of project and case study coursework, individually and in groups. The learning outcomes of the course are pursued by designing lecture and assessment material around practical problems and interaction with the economic and policy sectors of relevance to their studies.

Personal Development Planning is explicitly and implicitly developed during the course, including topics such as communication, time-management, team work, learning strategies and project management.

Additional training and self-study materials are available for students to develop appropriate IT skills, supported by academic staff in a pre-sessional IT course and during the programme. Technical English and foreign language training is available in a structured programme in addition to the academic course.

In addition the full-time PgDip and MSc students carry out a group project, in which they work with students from other courses, usually on a project sponsored by an external customer to produce a technical report. This enables them to develop their skills of individual and team working, including project management, time management and written and oral communication. Part-time students write a review of available information around a relevant topic including academic literature, presentation of ideas and analysis and the development of conclusions.

MSc students undertake an individual thesis project, such as the written analysis of an environmental case. This develops and tests their ability to plan and carry out a piece of research, their ability to apply theoretical knowledge and their critical thinking. Continual assessment and feedback on performance and personal development is given to students with suggested further study if required.

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

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

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

### A. **Postgraduate Certificate**

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Induction Module	0
Principles of Sustainability	10
Environmental Valuation	10
Financial and Economic Appraisal	10
Environmental Policy and Risk Governance	10
Technology, Environment and Society	10
<b>ELECTIVE MODULES:</b>	
Select one of the following:	10
Risk Communications and Perception	
Environmental Econometrics	
Evaluating Sustainability Through Lifecycle Approaches	
Natural Resource Economics	
Strategic Foresight	

Environmental Management in Practice	
<b>TOTAL:</b>	<b>60</b>

### B. Postgraduate Diploma

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

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

### 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
<b>COMPULSORY MODULES:</b>	
Induction Module	0
Principles of Sustainability	10
Environmental Valuation	10
Financial and Economic Appraisal	10

Environmental Policy and Risk Governance	10
Technology, Environment and Society	10
	40
Group Project (Full Time Students)	
Thesis	80
<b>ELECTIVE MODULES:</b>	
<b>EITHER</b> Risk Communications and Perception	10
<b>OR</b> Environmental Econometrics	
<b>EITHER</b> Evaluating Sustainability Through Lifecycle Approaches	10
<b>OR</b> Natural Resource Economics	
<b>EITHER</b> Strategic Foresight	10
<b>OR</b> Environmental Management in Practice	
Part Time Students: Group Project	40
OR Dissertation	40
<b>TOTAL:</b>	<b>200</b>

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  $\geq 50\%$ ;
- An average mark of  $\geq 50\%$  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);<sup>3 4</sup>

<sup>3</sup> 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).

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

- **For Taught Assessments**, the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of  $\geq 50\%$  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  $\geq 40$  credits, which are not part of the taught assessment average), the pass mark of  $\geq 50\%$  (where they exist);
- **For the thesis**, a mark of  $\geq 50\%$  in order to receive a pass (where it exists).

## 6. How is the course structured?

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

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

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

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

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

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

Guidance sessions are provided as to what is required from thesis and oral presentation. Within induction week, students will be introduced to personal development planning and asked to reflect on their transferable skills and to take ownership of their personal development during the course.

## Course modules

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

Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
1	I-ENV-INWK	Induction	T Brewer	33		0	Y		01/10/18	05/10/18	N/A	AO	N/A				N/A	
2	I-EMB-A1122	Principles of Sustainability	P Burgess	26		10	Y		08/10/18	12/10/18	40	ICW	100				FT 20/10/18 PT 03/11/18	July 19
3	I-EEM-A1184	Environmental Valuation	N Ozkan	27		10	Y		22/10/18	26/10/18	40	ICW	100				FT 10/11/18 PT 24/11/18	July 19

<sup>5</sup> Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

<sup>6</sup> Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

<sup>7</sup> 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  $\geq 50\%$ . This will be at the Board of Examiners discretion.

<sup>8</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>9</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>10</sup> 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.

<sup>11</sup> 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; IPRACT – Individual Practical; 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
4	I-ERM-A2014	Risk Communication and Perception	D Parsons	25		10	N		05/11/18	09/11/18	40			100	ICW GPRAC	70% 30%	ICW: FT 17/11/18 PT 01/12/18 GPRAC: FT & PT 09/11/18	July 19
5	I-EEM-A1185	Environmental Econometrics	M Rivas-Casado	21		10	N		05/11/18	09/11/18	40			100	ICW GPRES	80% 20%	ICW: FT 17/11/18 PT 02/12/18  GPRES: FT/PT 09/11/18	July 19
6	I-EMB-FEA	Financial and Economic Appraisal	P Burgess	25		10	Y		19/11/18	23/11/18	40	ICW	100				FT 01/12/18 PT 15/12/18	July 19
7	I-EDI-A1127	Evaluating Sustainability through life cycle approaches	A Williams	30		10	Y		03/12/18	07/12/18	40	ICW	100				F 02/01/19 P 12/01/19	July 19

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRACT – Individual Practical; 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
8	I-EEM-A1186	Natural Resource Economics	A Graves	25		10	N		03/12/18	07/12/18	40	ICW	100				FT 15/12/18 PT 05/01/19	July 19
9	I-ERM-A2006	Environmental Policy and Risk Governance	S Jude	30		10	N		07/01/19	11/01/17	40	ICW	100				FT 19/01/19 PT 02/02/19	July 19
10	I-EMB-A1128	Technology, Environment and Society	P Longhurst	25		10	Y		21/01/19	25/01/19	40	ICW	100				FT 02/02/19 PT 16/02/19	July 19
11	I-EMB-A1005	Strategic Foresight	K Garnett	30		10	Y		04/02/19	08/02/19	40	ICW	100				FT 16/02/19 PT 02/03/19	July 19
12	I-EMB-EMP	Environmental Management in Practice	G Drew	20		10	N		04/02/19	08/02/19	40	ICW	100				FT 16/02/19 PT 02/03/19	July 19
PROJECTS																		

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPAC – Individual Practical; 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
13	I-ENV-GRP	Group Project	Supervisors	16		40	Y		18/02/19	03/05/19	50	GPROJ ICW	80 20				GPROJ 29/04/19 ICW 04/05/19	
14	I-ENV-DISS	Dissertation (part time students)	Supervisors	10		40	Y		01/10/18	27/09/19	50	IPROJ IPRES	80 20				27/09/2019	
15	I-ENV-THESIS	Individual Research Project	Supervisors	20		80	Y		06/05/19	06/09/19	50	THESIS OR	90 10				02/09/19	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRACT – Individual Practical; GPRAC – Group Practical; I PROJ – 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.

<u>Module code</u>	<u>Module title</u>	<u>Course that owns the module</u>	<u>Other course(s)/ programme(s) that use the module</u>
I-EEM-A1184	Environmental Valuation	Environmental Management for Business	
I-EDI-A1127	Evaluating Sustainability through Life Cycle Approaches	Environmental Management for Business	<ul style="list-style-type: none"> <li>• Advanced Chemical Engineering - Biorefining route</li> <li>• Environmental Engineering</li> <li>• Cleantech Entrepreneurship</li> </ul>
I-EMB-FEA	Financial and Economic Appraisal	Environmental Management for Business	<ul style="list-style-type: none"> <li>• Future Food Sustainability</li> </ul>
I-EMB-A1122	Principles of Sustainability	Environmental Management for Business	<ul style="list-style-type: none"> <li>• Future Food Sustainability</li> <li>• Land Reclamation and Restoration</li> <li>• REMS EngD</li> </ul>
I-EMB-A1128	Technology, Environment and Society	Environmental Management for Business	<ul style="list-style-type: none"> <li>• REMS EngD</li> </ul>
I-EMB-A1005	Strategic Foresight	Environmental Management for Business	<ul style="list-style-type: none"> <li>• Future Food Sustainability</li> </ul>

## 7. How are the ILOs assessed?

The following assessment types are utilised:

The course is assessed as three elements:

\* The taught modules (40%) are assessed by in-module assessment, including coursework, which focuses on application of principles studied, and class tests, which support underpinning knowledge.

\* Group projects (20%) are assessed by means of a written group report and presentations;

\* The research project (40%), is assessed by a thesis and an oral examination

This approach has been adopted because:

The use of coursework is entirely appropriate and involves a mix of individual and group working as well as oral and poster presentations. Furthermore a number of the assignments are based on practical aspects of the modules.

## Assessment and ILO Mapping

### A. Postgraduate Certificate

<b>Award ILOs Module No.</b>	ILO 1	ILO 2	ILO 3
2	ICW		
3	ICW		
4		ICW GPRA C	ICW GPRA C
5	ICW GPRES		
6	ICW	ICW	
7	ICW		ICW
8	ICW		ICW
9	ICW	ICW	ICW
10		ICW	
11	ICW	ICW	
12			ICW

## **B. Postgraduate Diploma**

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

<b>Award ILOs Module No.</b>	ILO 4
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:

<b>Award ILOs Module No.</b>	ILO5	ILO 6
15	THESI S/OR	THESI S/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?**

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

The international nature of the course means that career opportunities are not restricted to the UK. Cranfield graduates develop careers around the world.

Some recent employers include UK Environment Agency, Golder Associates, WRG, Shanks, ERM, Environmental KIN, Enviro, Resource Recovery Forum, VR Group (Helsinki), Bouygues Construction, Honeywell, Virgin Media, Yorkshire Water, Caterpillar and National Energy Foundation.

**Cranfield University: Course Specifications**

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

**COURSE TITLE:** MSc in Environmental Water Management

**Date of first publication/latest revision:** 10/04/17/ March 2018

**1. What is the course?****Course information**

<b>Course Title</b>	Environmental Water Management
<b>Course code</b>	MSEWGFTC, MSEWGPTC, PDEWGFTC, PDEWGPTC, PCEWGFTC, PCEWGPTC
<b>Academic Year</b>	2018/19
<b>Valid entry routes</b>	MSc, PgDip, PgCert
<b>Additional Exit routes</b>	PgDip, PgCert
<b>Mode of delivery</b>	Full-time, Part-time
<b>Location(s)<sup>1</sup> of Study</b>	Cranfield Campus
<b>School(s)</b>	School of Water, Energy and Environment
<b>Theme</b>	Water
<b>Centre</b>	Cranfield Water Sciences Institute
<b>Course Director</b>	Dr Dolores Rey Vicario
<b>Awarding Body</b>	Cranfield University
<b>Is this an AP Contract course?<sup>2</sup></b>	No
<b>Teaching Institution</b>	Cranfield University
<b>Admissions body</b>	Cranfield University
<b>Entry requirements</b>	Minimum 2 <sup>nd</sup> class UK honours degree or equivalent or relevant industrial experience. Language proficiency for non-UK students: TOEFL: 237 (computer version), 580 (paper version), or TOEIC: 830, or IELTS: 6.5 minimum, or Cambridge certificate: C or above
<b>UK Qualifications Framework Level</b>	QAA FHEQ Level 7 (Masters)

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

<sup>2</sup> AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

<b>Benchmark Statement(s)</b>	N/A
<b>Registration Period(s) available</b>	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
<b>Course Start Month(s)</b>	October: Full-time Part-time: throughout the year (October preferred, other times on case by case basis)

### **Institutions delivering the course**

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

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

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

- The Environment Agency
- The Open University
- Anglian Water

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

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

Cranfield University has agreements with a number of top quality European higher education institutions through its European Partnership Programme (EPP). Within these agreements students from partner institutions have the opportunity to take a Master of Science (MSc) at Cranfield University as an alternative to the final year of their home university programme. The EPP provides a feeder-stream of European students to Environmental Water Management and in doing so contributes to the diversity of the class.

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

### **Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)**

This course is accredited formally by Chartered Institution of Water and Environmental Management (CIWEM) until October 2021.

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

Cranfield University offers this course in order to:

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

This programme is intended for the following range of students:

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

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

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

### **A. Postgraduate Certificate in Environmental Water Management**

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

- ILO 1. Identify the principal controls on water quantity, water quality and aquatic ecology, and assess the relative importance of natural and anthropogenic factors
- ILO 2. Interpret and critically evaluate the quality of research and data, and determine relevance for application in relation to solving academic and practical problems
- ILO 3. Select and apply appropriate analytical, statistical, modelling or decision-support tools to existing environmental data, and interpret the findings in the context of current environmental regulation.
- ILO 4. Develop and critically assess appropriate and sustainable solutions to environmental water management problems in natural and man-made environments with due regard to the technical, social and institutional constraints imposed by the surrounding environment

### **B. Postgraduate Diploma in Environmental Water Management**

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

- ILO 5. Integrate knowledge, understanding and skills from the taught modules in a real-life situation to address problems faced by industrial clients; creating new problem



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

### C. MSc in Environmental Water Management

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

- ILO 6. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought.
- ILO 7. To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences.

### 4. How is the course taught?

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

- Structured teaching and learning activities in the taught modules (e.g. lectures, workshops, computer practicals) that support students in their completion of the assessments and provide discipline-specific and transferable skills training
- Being provided with the opportunity to undertake externally sponsored or supported thesis project research
- Undertaking field and laboratory work within the context of group and thesis projects to integrate and apply knowledge and skills
- Students are allocated project supervisors for their thesis and group projects who guide the research and provide formative feedback on reports and presentations
- Course Director, Module Convenors, and other academic staff are readily available for informal advice and feedback

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

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

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

#### A. Postgraduate Certificate

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

Description	Credits
<b>COMPULSORY MODULES:</b>	

Induction	0
<b>ELECTIVE MODULES:</b>	
Any six of the following modules:	
Surface and Groundwater Hydrology	10
Catchment Water Quality	10
Aquatic Ecosystems	10
Modelling Environmental Processes	10
Drought and Water Scarcity	10
Flood Risk Management	10
Water in Cities	10
Integrated River Basin Management	10
<b>TOTAL:</b>	<b>60</b>

## B. Postgraduate Diploma

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

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

## 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
<b>COMPULSORY MODULES:</b>	
Induction	0
Surface and Groundwater Hydrology	10

Catchment Water Quality	10
Aquatic Ecosystems	10
Modelling Environmental Processes	10
Drought and Water Scarcity	10
Flood Risk Management	10
Water in Cities	10
Integrated River Basin Management	10
Group Project (Full-time students)	40
Thesis Project	80
<b>ELECTIVE MODULES:</b>	
Part Time Students: Group Project	40
OR Dissertation	40
<b>TOTAL:</b>	<b>200</b>

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  $\geq 50\%$ ;
- An average mark of  $\geq 50\%$  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);<sup>3 4</sup>
- **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  $\geq 50\%$  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

<sup>3</sup> 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).

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

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

## 6. How is the course structured?

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

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

All options are also offered on a part-time basis and such students are expected to complete the course within 2 to 3 years. Part-time students are not restricted to starting in October. Instead they are offered individual guidance on the best sequence of study based on their prior knowledge and availability to attend.

## Course modules

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

Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
1	I-WAT-INWK	Induction Week	A Parker	24		0	Y		01/10/18	05/10/18	N/A	AO	N/A				N/A	
2	I-WAM-A1163	Surface and Groundwater Hydrology	I Holman	27		10	Y		08/10/18	12/10/18	40	EX	100				Exam week 2 – 04/01/19	Sept 19
3	I-WAM-A1165	Catchment Water Quality	P Campo Moreno	27		10	N		22/10/18	26/10/18	40	ICW	100				FT 03/11/18 PT 17/11/18	June 19

<sup>5</sup> Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

<sup>6</sup> Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

<sup>7</sup> 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  $\geq 50\%$ . This will be at the Board of Examiners discretion.

<sup>8</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>9</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>10</sup> 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.

<sup>11</sup> 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment		Submission dates		
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
4	I-ILE-AEL	Aquatic Ecosystems	R Grabowski	30		10	N		05/11/18	09/11/18	40	ICW	100				FT 17/11/18 PT 01/12/18	June 19
5	I-EI-A1001	Modelling Environmental Processes	J Meersmans	26		10	Y		19/11/18	23/11/18	40			100	ICW IPRES	40 60	FT 01/12/18 PT 15/12/18 IPRES FT/ PT W/c 26/11/18	June 19
6	I-WAM-DWS	Drought and Water Scarcity	D Rey Vicario	30		10	N		03/12/18	07/12/18	40	ICW	100				FT 15/12/18 PT 03/01/19	June 19
7	I-WAM-A1175	Flood Risk Management	T Hess	30		10	N		07/01/19	11/01/19	40	ICW	100				FT 19/01/19 PT 02/02/19	June 19
8	I-WAM-WC	Water in Cities	H Smith	30		10	Y	21/01/19	28/01/19	01/02/19	40	IPRES	100				FT/ PT 31/01/19	June 19
9	I-WAM-IRM	Integrated River Basin Management	R Grabowski	24		10	N	04/02/19	06/02/19	13/02/19	40	ICW	100				FT 16/02/19 PT 02/03/19	June 19
PROJECTS																		

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRACT – Individual Practical; 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
10	I-WAT-GRPP	Group Project	J MacAdam	16		40	Y		18/02/19	03/05/19	50	GPROJ ICW	80 20				29/04/19 04/05/19	
11	I-WAT-DISS	Individual Project (PT MSc and PgDip only)	J MacAdam	10		40	Y		01/10/18	27/09/19	50	IPROJ IPRES	80 20				27/09/19	
12	I-WAT-THESIS	Individual Research Project	J MacAdam	20		80	Y		06/05/19	06/09/19	50	THESIS OR	90 10				02/09/19	Sept 20

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRACT – Individual Practical; 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.

<u>Module code</u>	<u>Module title</u>	<u>Course that owns the module</u>	<u>Other course(s)/ programme(s) that use the module</u>
I-WAM-A1163	Surface Water & Groundwater Hydrology	<ul style="list-style-type: none"> <li>Water and Sanitation for Development</li> </ul>	<ul style="list-style-type: none"> <li>Environmental Water Management</li> </ul>
I-EI-A1001	Modelling Environmental Processes	<ul style="list-style-type: none"> <li>Environmental Water Management</li> </ul>	<ul style="list-style-type: none"> <li>Environmental Engineering</li> <li>Geographical Information Management</li> </ul>
I-WAM-WC	Water in Cities	<ul style="list-style-type: none"> <li>Environmental Water Management</li> </ul>	<ul style="list-style-type: none"> <li>Water and Sanitation for Development</li> </ul>

## 7. How are the ILOs assessed?

The following assessment types are utilised:

The MSc course is assessed as three elements:

- the taught modules (40%) are assessed by in-module assessment (including coursework, which focuses on application of principles studied and class tests, which support underpinning knowledge) or examination in January;
- group projects (20%) are assessed by means of a written group report and presentations

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

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

This approach has been adopted because:

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

## Assessment and ILO Mapping

### A. Postgraduate certificate

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



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

## B. Postgraduate Diploma

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

<b>Award ILOs Module No.</b>	ILO 5
I-WAT-GRPP	GRPOJ IRPOJ
I-WAT-DISS	IRPOJ IPRES

## C. MSc

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

<b>Award ILOs Module No.</b>	ILO6	ILO 7
I-WAT-THESIS	THESIS OR	THESIS OR

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

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

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

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

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

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

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

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

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

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

New Partnership arrangements are considered in two stages:

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

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

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

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

On completion, graduates have a broader network of global contacts, increased opportunities for individual specialism in their chosen career, and the capability to make an immediate and real contribution to improved water supply and sanitation. Cranfield Environmental Water Management graduates are highly sought after by employers. Typical employers include:

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

## **COURSE SPECIFICATION**



### **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:** Executive Logistics & Supply Chain Management

**Date of first publication/latest revision:** June 2018

#### **1. What is the course?**

##### **Course information**

<b>Course Title</b>	Executive Logistics & Supply Chain Management
<b>Course code</b>	MSLOSPTC, PCLOSPTC, PDLOSPTC
<b>Academic Year</b>	2018/19
<b>Valid entry routes</b>	MSc, PgCert, PgDip
<b>Additional exit routes</b>	Not Applicable
<b>Mode of delivery</b>	Part-time
<b>Location(s)<sup>1</sup> of Study</b>	Cranfield
<b>School(s)</b>	School of Management
<b>Theme</b>	Leadership and Management
<b>Centre</b>	Logistics, Procurement and Supply Chain Management
<b>Course Director</b>	Dr Soroosh Saghiri
<b>Awarding Body</b>	Cranfield University
<b>Is this an AP Contract course?<sup>2</sup></b>	No
<b>Teaching Institution</b>	Cranfield University
<b>Admissions body</b>	Cranfield University
<b>Entry requirements</b>	Standard University entry requirements
<b>UK Qualifications Framework Level</b>	QAA FHEQ Level 7 (Masters)
<b>Benchmark Statement(s)</b>	N/A
<b>Registration Period(s) available</b>	Part-time MSc – up to 3 years
<b>Course Start Month(s)</b>	February

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

<sup>2</sup> 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 Logistics, Procurement and Supply Chain Management where the research interests include logistics, supply chain management and marketing.

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

- students undertake their individual thesis project within their own organisation or field of business, which builds further contacts and opportunities for collaboration with those organisations
- the course contains a number of talks by external speakers from companies such as Accenture, Gartner Research, or from partner academic institutions
- one of the two external examiners for the course is always from the non-academic sector, the other being an academic.
- the course has an Industrial Advisory Board

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

## **Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)**

The MSc Executive Logistics and Supply Chain Management is accredited formally by The Chartered Institute of Logistics & Transport until 2021 and The Chartered Institute of Purchasing and Supply until August 2018, and European Logistics Association until May 2020.

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

Cranfield University offers this course in order to fulfil a market demand for highly capable graduates in the field of Logistics, Procurement and Supply Chain Management. The course further aims to offer personal and specialist skills development for candidates with extensive industrial experience. These objectives are addressed through the aims of the course which are to provide students with:

- an overall appreciation of logistics and supply chain management and their importance to modern business
- appropriate technical knowledge in the key areas of Logistics and Supply Chain Management
- an understanding of the analytical and managerial skills that will enable them to apply this knowledge within a business environment
- an understanding of the need to manage and plan supply chains within an overall business environment in an integrated and co-ordinated manner

This programme is intended for the following range of students:

- candidates with a minimum of three years business or organisational experience in a supply chain-related role;
- candidates with a similar level of experience in a non-supply chain area who are intending to move into the supply chain field, or have recently had a change in career track.

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

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

### **A. Postgraduate Certificate**

- ILO1. Demonstrate and analyse a systematic knowledge of supply chain management in general and a critical awareness of current supply problems and new thinking at the forefront of the discipline.

- ILO2. Appraise and apply appropriate techniques to address specific challenges in supply chain management

### **B. Postgraduate Diploma**

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

- ILO 3. Value a comprehensive and critical knowledge of logistics and supply chain components
- ILO 4. Investigate and solve advanced and complex real-life supply chain problems systematically and creatively using a range of quantitative techniques, analytical tools and supply chain design methodologies.
- ILO 5. Design and organise supply chains within an overall business environment in an integrated and coordinated manner
- ILO 6. Compare, contrast, and select appropriate supply chain management frameworks, theories, and techniques, and contextualise them for a variety of real-life situations.
- ILO 7. Evaluate and develop logistics and supply chain frameworks to address cultural, organisational and sustainability issues.

### **C. MSc**

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

- ILO 8. Undertake independent and original research on a relevant supply chain subject, demonstrating the ability to design, plan, manage and execute an industrial or research based project within a specified time scale.
- ILO 9. Produce a high quality thesis, based on self-directed, creative research including critical literature review, justified research method(s), valid data gathering, analysis and interpretation, and report writing.

## **4. How is the course taught?**

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

- Lectures by the Cranfield University faculty members and external speakers from industry
- Tutorial support throughout the course, including a meeting with personal tutor during each one week module
- Extensive use is made of the course VLE as a means of delivering material to support and augment classroom learning.

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

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

### **Executive Logistics & Supply Chain Management**

#### **A. Postgraduate Certificate**

The accumulation of 60 credits through the assessment of taught modules (note: “Supply Chain Strategy and Sustainability” module is a compulsory module for Postgraduate Certificate) as detailed below:

Description	Credits
<b>COMPULSORY MODULES:</b>	
<b>Module 1</b>	<b>10</b>
<b>Five modules from 2-13</b>	<b>50</b>
<b>TOTAL:</b>	<b>60</b>

## B. Postgraduate Diploma

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
<b>Module1</b>	<b>10</b>
<b>Eleven modules from 2-13</b>	<b>110</b>
<b>TOTAL:</b>	<b>120</b>

## C. MSc

The accumulation of 130 credits through the assessment of taught modules and, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
<b>COMPULSORY MODULES:</b>	
<b>1-13</b>	<b>130</b>
<b>14</b>	<b>0</b>
<b>15</b>	<b>70</b>
<b>TOTAL:</b>	<b>200</b>

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  $\geq 50\%$ ;
- An average mark of  $\geq 50\%$  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);<sup>3 4</sup>

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

- **For Taught Assessments**, the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of  $\geq 50\%$  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  $\geq 40$  credits, which are not part of the taught assessment average), the pass mark of  $\geq 50\%$  (where they exist);
- **For the thesis**, a mark of  $\geq 50\%$  in order to receive a pass (where it exists).

## 6. How is the course structured?

### Cranfield

Part-time students register for the course in February and are expected to complete the course within 2 years.

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<sup>4</sup> 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 code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
Module Number												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
		SOM MSc Induction	Dr Soroosh Saghiri	16		0	Y		22.02.19	26.02.19	N/A	AO	N/A				N/A	
1	M-L/SCSS Occ E	Supply Chain Strategy and Sustainability	Dr Heather Skipworth	16		10	Y		22.02.19	26.02.19	40 40	GPRES ICW	25 75				26/2/19 25/3/19	

<sup>5</sup> Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

<sup>6</sup> Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

<sup>7</sup> 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  $\geq 50\%$ . This will be at the Board of Examiners discretion.

<sup>8</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>9</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>10</sup> 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.

<sup>11</sup> 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar				Assessment						
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
2	M-L/PSP Occ E	Principles of Strategic Procurement	Dr Soroosh Saghiri	16		10	Y		08.04.19	12.04.19	40	ICW	100				6/5/19	
3	M-L/ACF Occ E	Accounting and Finance	Dr Simon Templar	16		10	Y		17.02.20	21.02.20	40	EX	100				22/2/20	
4	M-L/ATS Occ E	Analytical Techniques for Supply Chain Management	Dr Emel Aktas	16		10	Y		08.04.19	12.04.19	40	ICW	100				27/5/19	
5	M-L/FRT Occ E	Freight Transport	Prof Melvyn Peters	16		10	Y		03.06.19	07.06.19	40	ICW	100				1/7/19	
6	M-L/IOM Occ E	Inventory and Operations Management	Dr Anurag Tewari	16		10	Y		16.09.19	20.09.19	40			100 MULTI	GCW ICW	60 40	14/10/19 14/10/19	
7	M-L/ISB Occ E	Information Systems and e-Business	Dr Syed Imran Ali	16		10	Y		17.02.20	21.02.20	40 40	GCW ICW	80 20				16/3/20	
8	M-L/PMI Occ E	Project Management Introduction	John Algar	20		10	Y		14.09.20	18.09.20	40			100 MULTI	GCW GPRAC GPRES	30 40 30	18/09/20	
9	M-L/PND Occ E	Physical Network Design	Dr Nicky Yates	16		10	Y		03.06.19	07.06.19	40	ICW	100				22/7/19	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPAC – Individual Practical; 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar				Assessment						
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
10	M-L/WHS Occ E	Warehousing	Dr Hendrick Reefke	16		10	Y		16.09.19	20.09.19	40	ICW	100				4/11/19	
11	M-M/STG Occ E	Strategic Management	Prof Mark Jenkins	16		10	Y		20.04.20	24.04.20	40	GPRES GCW	50 50				18/05/20	
12	M-M/GME Occ E	Global Macroeconomics and Business Environment	Prof Joe Nellis	16		10	Y		01.06.20	05.06.20	40	GCW	100				29/6/20	
13	M-T/OBA Occ E	Organisational Behaviour: Application	Dr Richard Kwiatkowski	16		10	Y		01.06.20	05.06.20	40	ICW	100				20/7/20	
14	M-T/EBM Occ E	Evidence Based Management	Valentina Battista	16		0	Y		20.04.20	24.04.20	n/a	AO	N/A				N/A	
15	MXL/THS Occ A	Thesis	Various	0		70	N				50	Thesis	100				14/12/20	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPAC – Individual Practical; 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.

<u>Module code</u>	<u>Module title</u>	<u>Course that owns the module</u>	<u>Other course(s)/ programme(s) that use the module</u>
M-L/SCSS	Supply Chain Strategy and Sustainability	FT MSc LSCM	PSCM; ELSCM
M-L/PSP	Principles of Strategic Procurement	FT MSc LSCM	PSCM; ELSCM
M-L/ACF	Accounting and Finance	FT MSc LSCM	PSCM; ELSCM; MiM; MCS; MENT; SM
M-L/ATS	Analytical Techniques for Supply Chain Management	FT MSc LSCM	PSCM; ELSCM
M-L/FRT	Freight Transport	FT MSc LSCM	PSCM; ELSCM
M-L/IOM	Inventory and Operations Management	FT MSc LSCM	PSCM; ELSCM
M-L/ISB	Information Systems and e-Business	FT MSc LSCM	PSCM; ELSCM
M-L/PMI	Project Management Introduction	FT MSc LSCM	PSCM; ELSCM
M-L/PND	Physical Network Design	FT MSc LSCM	PSCM; ELSCM
M-L/WHS	Warehousing	FT MSc LSCM	PSCM; ELSCM
M-M/STG	Strategic Management	MBA	EMBA; ELSCM
M-M/GME	Global Macroeconomics and Business Environment	MBA	EMBA; ELSCM
M-T/OBA	Organisational Behaviour: Application	MSc Management	MCS; MENT; ELSCM
M-T/EBM	Evidence Based Management	MSc Management	MCS; MENT; ELSCM; MML

## 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 two written examinations, fourteen pieces of written assessment, plus an individual thesis for the MSc.

This approach has been adopted in order to ensure that students demonstrate their understanding through a wide range of learning techniques, but are not disadvantaged through any one approach.

## Assessment and ILO Mapping

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

**Executive MSc in Logistics and Supply Chain Management (ILO1–9)**  
Needs 200 credits from all taught modules plus thesis

**Postgraduate Diploma (ILO1-7)**  
Needs 120 credits from taught modules

Award ILOs Module # /Assessment	PgCert (ILO1-2) Needs 60 credit from taught modules								
	ILO1	ILO2	ILO3	ILO4	ILO5	ILO6	ILO7	ILO8	ILO9
Supply Chain Strategy and Sustainability	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Freight Transport	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
Warehousing	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			
Analytical Techniques for Supply Chain Management	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			
Information Systems and E-Business	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
Inventory and Operations Management	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
Accounting and Finance	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>					
Principles of Strategic Procurement	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Physical Network Design	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			
Project Management Introduction		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Strategic Management		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Global Macroeconomics and Business Environment		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Organisational Behaviour: Application	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Evidence Based Management	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Thesis	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

**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 graduates from the part-time course are likely to be in employment and many maybe sponsored by their employer. However many of these graduates are able to fast-track their careers through the skills and knowledge gained on the course.

Similarly, some graduates choose to use the qualification to move to another employer and there have been many examples of individuals advancing their career by moving into higher-ranked positions in global organizations.

There continues to be a high level of demand for well-qualified Masters graduates in Supply Chain Management and this course is recognised by industry as being at the forefront of meeting that demand.

## **COURSE SPECIFICATION**



### **Cranfield University: Course Specifications**

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

**COURSE TITLE:** Executive Master of Business Administration

**Date of first publication/latest revision:** May 2018

#### **1. What is the course?**

##### **Course information**

<b>Course Title</b>	Executive Master of Business Administration Executive Master of Business Administration (Defence) Executive Master of Business Administration (Mastership) Executive MBA (Defence Export)
<b>Course code</b>	MBEXMPTC, MBCMDPTR (Defence) CODE FOR (Defence Export)
<b>Academic Year</b>	2018/19
<b>Valid entry routes</b>	MBA
<b>Additional exit routes</b>	PgCert in Business Administration PgDip in Business Administration
<b>Mode of delivery</b>	Part-time
<b>Location(s)<sup>1</sup> of Study</b>	Cranfield University
<b>School(s)</b>	School of Management
<b>Theme</b>	Leadership and Management
<b>Centre</b>	Centre for Management
<b>Course Director</b>	Dr Daniel Prior
<b>Awarding Body</b>	Cranfield University
<b>Is this an AP Contract course?<sup>2</sup></b>	Defence only
<b>Teaching Institution</b>	Cranfield University
<b>Admissions body</b>	Cranfield University
<b>Entry requirements</b>	<ul style="list-style-type: none"><li>• A minimum of three years' post-qualification work experience.</li><li>• A good degree and / or professional qualification.</li><li>• Applicants who do not have a degree are welcomed provided they can demonstrate high levels of achievement, exceptional</li></ul>

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

<sup>2</sup> AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract



	<p>career progression or evidence of leadership potential.</p> <p>If you are an international student you will need to provide evidence that you have achieved a satisfactory test result in an English qualification. The minimum standard expected from a number of accepted courses are as follows: IELTS – 7, TOEFL – 100, Pearson PTE Academic- 68, Cambridge English Scale – 190, Cambridge English: Advanced – A, Cambridge English: Proficiency – B.</p>
<b>UK Qualifications Framework Level</b>	QAA FHEQ Level 7 (Masters)
<b>Benchmark Statement(s)</b>	Not Applicable
<b>Registration Period(s) available</b>	3 years
<b>Course Start Month(s)</b>	September and January

### **Institutions delivering the course**

This course is delivered by the School of Management where the research interests consist of a wide range of management functions.

Teaching and assessment is provided by the School of Management with input on some modules from Grant Thornton.

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

- All students will undertake a group consulting project in an external organisation, presenting findings to senior managers from the organisation involved
- Each module will incorporate input from senior managers/practitioners where appropriate
- Some of the modules require learning teams to visit an organisation to audit their approach
- Some students undertake research and/or project work off campus, within organisations. In some cases this will take the form of a short term internship, again assessed by project submission

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 Association to Advance Collegiate Schools of Business (AACSB) and the Association of MBAs (AMBA). It is also accredited by the European Quality Improvement System (EQUIS).

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

The Cranfield MBA aims to provide a distinctive and collaborative learning experience centred on a process of intense, interactive classroom sessions where the combination of the professional experience of a diverse student cohort and the faculty's direct involvement with global businesses ensures graduates have a deep understanding of contemporary business issues and the capacity to assume active leadership roles. This experience is founded on the integration of four aims:

- To develop a group of influential leaders who will make a significant impact on their organisations and the wider community.
- To deliver a contemporary and comprehensive knowledge of core business functions enabling students to talk knowledgeably to experts in these areas.
- To create a strategic mindset capable of viewing organisations as consisting of functions and groups whose actions must be motivated and aligned to meet objectives.
- To generate the self-awareness and confidence to operate effectively as a member of and/or leader of a team drawn from a variety of cultures, business experience and personalities.
- To create an understanding as to how to develop leadership capabilities in self and others in order to meet the increasing challenge of change.

This programme is intended for the following range of students:

- Experienced professionals who want a "real-world" business education which they can apply directly back to their workplace.
- Self-motivated managers who are keen to improve themselves, enhance their skills, knowledge and abilities, and become more effective leaders.
- Energetic entrepreneurs who want support to start a new business or grow their existing business.

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

#### **Award intended learning outcomes (ILOs) (skills and knowledge)**

##### **A. MBA**

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

- ILO 1. Demonstrate robust yet flexible qualities of leadership and an understanding of a wide range of management techniques.
- ILO 2. Exhibit a conceptual understanding of the main functional areas of management and a systematic knowledge of the relevant literature.
- ILO 3. Have a thorough understanding of the importance of strategy, cross-function working and managing core business processes.
- ILO 4. Articulate a critical awareness of the global environment within which organisations operate and the cultural, political, managerial and ethical ambiguities and risks that this gives rise to.
- ILO 5. Display the capability to identify, analyse and implement appropriate conclusions for complex problems, in the context of uncertainty and change.
- ILO 6. Critically evaluate their personal strengths, weaknesses and preferences.
- ILO 7. Present confidence in working with others and an ability to argue and present coherently and persuasively influence.
- ILO 8. Develop an ability to work with peers in order to create and implement effective strategies.
- ILO 9. Demonstrate robust qualities of leadership.
- ILO 10. Deal with challenging individuals and situations effectively.
- ILO 11. Understand how to manage their career development.

Students following a prescribed MBA pathway will also be able to contextualise the above ILOs with respect to their chosen specialism and/or sector.

#### 4. How is the course taught?

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

- The programme is delivered through classroom and online (blended) interaction combined with a high proportion of team work, group projects and private study.

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

- being placed in a diverse learning team and supervised by a pool of learning team mentors from within the School of Management
- being exposed to a range of psychometric tests and an assessment centre exercise; and
- one-to-one coaching from professionals.

#### 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. MBA

The accumulation of 240 credits through the assessment of taught modules as detailed below:

Description	Credits
<b>COMPULSORY MODULES:</b>	
Module 1, 12	40
Modules 2-11, 13-14	120
<b>ELECTIVE MODULES:</b>	
80 credits from Modules 15-33	80
<b>TOTAL:</b>	<b>240</b>

##### B. MBA (Mastership)

The accumulation of 240 credits through the assessment of taught modules as detailed below:

Description	Credits
<b>COMPULSORY MODULES:</b>	
Module 1, 12	40
Modules 2-11, 13-14, 21, 24, 25, 33	160
<b>ELECTIVE MODULES:</b>	
40 credits from Modules 15-20, 22, 23, 26-32	40
<b>TOTAL:</b>	<b>240</b>

##### C. MBA (Defence)

The accumulation of 240 credits through the assessment of taught modules as detailed below:

Description	Credits
<b>COMPULSORY MODULES:</b>	
Module 1, 12	40
Modules 2-11, 13-14, 23-24, 36-40	190
<b>ELECTIVE MODULES:</b>	
10 credits from Modules 15-22, 25-33	10
<b>TOTAL:</b>	<b>240</b>

#### D. MBA (Defence Export)

The accumulation of 240 credits through the assessment of taught modules as detailed below:

Description	Credits
<b>COMPULSORY MODULES:</b>	
Module 1, 12	40
Modules 2-11, 13-14, 21, 24, 25, 33, 41--44	200
<b>ELECTIVE MODULES:</b>	
n/a	
<b>TOTAL:</b>	<b>240</b>

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 achieve your award, you are required to achieve:

Each assessment is awarded a mark out of 100 per cent. Where a module is assessed with more than one assessment e.g., a group project and an examination, marks are awarded separately for each assessment and then weighted together to determine the mark for the module. A student will be deemed to have passed a module if he/she achieves a mark of 50 per cent or more. Each module carries a number of credits which are used as the weightings to calculate an overall weighted average mark for each part of the Programme. Part I and Part II of the Programme are assessed separately and a student will be regarded as having failed either if he/she:

- (1) achieve an overall weighted average of less than 50 per cent;
- or (2) achieve a mark of less than 50 per cent on more than 30 credits
- or (3) achieve a mark of less than 30 per cent on more than 10 credits.

These conditions apply separately to Part I and Part II of the Programme.

In any **compulsory** module a mark of less than 40 per cent for the individual assessment – it may be an exam or a project – will result in the module receiving a maximum mark of 49 per cent irrespective of the marks gained in any assessed group work. In short you will be deemed to have failed the module.

**MBA (Defence)** The pass criterion for the MBA(D) is the same as MBA above except that MBA(D) students have to select modules 23, 24, 36 to 40.

**MBA (Mastership)** The pass criterion for the MBA(M) is the same as MBA above except that MBA(M) students have to select modules 21, 24, 25 and 33.

MBA (Defence Export) the pass criterion for the MBA (DE) is the same as MBA above except that MBA (DE) students have to select modules 21, 24, 25, 33, 40-44.

### **Resit Policy**

If the mark for Part I indicates failure students will have the opportunity to resit examinations or individual assessments up to a maximum of 30 credits in Part I. If the individual element of the module failed was an examination the resit will be an examination and if it was an individual written project, the student will be required to resubmit a project. However, in both cases the module leader can (with the permission of the Academic Programme Director) change the nature of the resit. The main purpose of resits is to give students who would otherwise fail Part I a final opportunity to pass it but in a manner that does not create an unfair opportunity for students to increase their overall module average. Therefore:

- students will only be allowed to take resits if they are deemed to have failed Part I due to one of the three criteria set above; and
- all resit marks will be capped at 50 per cent; and
- students can only resit an examination once.

In determining whether or not having taken resits a student is deemed to have passed Part I, the highest of the following will stand, subject to a **maximum** mark of 50 per cent:

- the resit exam mark;
- the overall module mark with the resit exam mark substituted for, and given the same weighting as, the **original** individual assessment mark;
- the **original overall module mark**.

### **Resit opportunities are not permitted in Part II**

## **6. How is the course structured?**

Part-time students register for the course in September or January and are expected to complete the course within 2 years.

The MBA programme is in two parts. Part I lasts for one year and consists of compulsory modules designed to provide students with a contemporary understanding of basic business functions e.g. accounting, and marketing. Part II is the second year of the programme—and here students gain discretion over their learning by choosing from a range of electives, the subjects they believe will be most beneficial to their learning and future careers. Throughout the whole programme i.e. Part I and II, the Developing Leadership theme is emphasised through four compulsory modules dealing with self-awareness, leadership skills and contemporary leadership challenges. In Part II students have an opportunity to join together for the International Business Assignment. During this period students choose a traditional “study tour” consisting of a visit to a business school and companies in a country chosen from a short-list, or field trips where small groups of students work with small companies or charities in a different culture.

## Course modules – September 2018 Year 1 – Occurrence B

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

Module Number	Module code	Title	Module Leader	Contact hours <sup>3</sup>	Total hours delivered by Visiting Lecturers <sup>4</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>5</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>6</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>7</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>8</sup>	Assessment Submission and/or exam date <sup>9</sup>	Assessment / Exam Retake date
1	MXM/PPF Occ B18	Organisational Behaviour: Personal and Professional Foundations of Leadership and Change	Dr Richard Kwiatkowski	32		20	N		27/09/18	26/01/19		I PROJ	100				20/03/19	
2	MXM/ACT Occ B18	Accounting	Matt Nnadi /Andy Mack	16		10	N		23/11/18	15/12/18		EX	100				24/01/19	

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

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

<sup>5</sup> 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.

<sup>6</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>7</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>8</sup> 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.

<sup>9</sup> 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; IPRACT – Individual Practical; 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 <sup>3</sup>	Total hours delivered by Visiting Lecturers <sup>4</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>5</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>6</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>7</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>8</sup>	Assessment Submission and/or exam date <sup>9</sup>	Assessment / Exam Retake date
3	MXM/SOM Occ B18	Strategic Operations Management	Dr Abdulkader Aoufi	16		10	N		27/09/18	27/10/18		ICW	100				21/11/18	
4	MXM/MKT Occ B18	Strategic Marketing	Prof Emma Macdonald	16		10	N		28/09/18	26/10/18		GPRES ICW	50 50				26/10/18 20/02/19	
5	MXM/ECB S Occ B18	Economics and Business Strategy	Dr Catarina Figueira	16		10	N		22/11/18	26/01/19		GCW	100				20/03/19	
6	M-M/ENT Occ B18	Entrepreneurship and New Venture Creation	Dr Shailendra Vyakarnum	16		10	Y		22/02/19	22/03/19		GCW	100				22/05/19	
7	MXM/FM Occ B18	Financial Management	Andrea Moro, Paul Richards	16		10	N		22/02/19	22/03/19		EX	100				25/04/19	
8	M-M/STG Occ B18	Strategic Management	Prof Mark Jenkins	16		10	Y		24/05/19	22/06/19		GPRES GCW	50 50				24/07/19 28/08/19	
9	MXM/P2M Occ B18	Programme and Project Management	Stephen Carver	16		10	Y	23/03/19	26/04/19	27/04/19		EX	40	60 MULTI	GCW GPRAC	30 30	23/05/19 24/04/19 29/04/19	
10	M-M/GME Occ B18	Global Macroeconomics and Business Environment	Prof Joe Nellis	16		10	Y		20/06/19	19/07/19		GCW	100				04/09/19	
11	M-M/ MPCS Occ B18	Challenges for Leaders: Managing	Prof Clare Kelliher	16		10	N		24/05/19	21/06/19		EX	100				18/07/19	

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

Module Number	Module code	Title	Module Leader	Contact hours <sup>3</sup>	Total hours delivered by Visiting Lecturers <sup>4</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>5</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>6</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>7</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>8</sup>	Assessment Submission and/or exam date <sup>9</sup>	Assessment / Exam Retake date
		People, Change and Sustainability																
12	M-M/DMDA Occ B18	Data Analytics and Decision Making	Dr Andy Angus	32		20	Y		22/11/18	25/07/20		EX GPROJ	30 70				21/02/19 25/07/20	
	<b>XY2</b>																	
13	MXM/LWI Occ B	Leading with Impact	TBC	16		10	N					ICW	100					
14	M-M/ESB Occ B	Entrepreneurial Finance for Early Stage Businesses	Dr Stephanie Hussels	16		10	Y							100 MULTI	GCW GPRES GCW GPRES	30 25 25 20		
15	M-M/IBA Occ B	International Business Assignment	Emma Parry	20		10	Y					ICW GCW	20 80					
16	M-M/EFI Occ B	Entrepreneurial Finance for Later Stage Businesses	Dr Oksana Koryak	16		10	Y					ICW ICW	60 40					
17	M-M/IST Occ B	International Strategy	Prof Patrick Reinmoeller	16		10	Y					GCW ICW	80 20					

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRACT – Individual Practical; 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 <sup>3</sup>	Total hours delivered by Visiting Lecturers <sup>4</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>5</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>6</sup> (%) of independent assessments	Weighting within module of multi-part assessments <sup>7</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>8</sup>	Assessment Submission and/or exam date <sup>9</sup>	Assessment / Exam Retake date
18	M-M/MMA Occ B	Managing International Mergers and Acquisitions	Dr Richard Schoenberg	16		10	Y					GCW	100					
19	M-M/CFS Occ B	Corporate Financial Strategy	TBC	16		10	Y					EX	100					
20	MXM/CFTR Occ B	Corporate Finance Transactions	TBC	16		10	N					ICW GCW	10 90					
21	M-M/SCC Occ	Strategizing in Challenging Contexts	Dr Richard Schoenberg	16		10	Y					GPRES GCW	20 80					
22	M-M/SHR Occ B	Strategic Human Resource Management in the 21 <sup>st</sup> Century	Prof Clare Kelliher	16		10	Y					ICW	100					
23	M-M/DVSC Occ B	Driving Value Through the Supply Chain	Michael Bernon	16		10	Y					ICW	100					
24	M-M/NBO Occ B	Negotiating in Business and Organisations	Dr Ian Speakman	16		10	Y					ICW	100					
25	MXM/MST Occ B	Managing Strategic Innovation	TBC	16		10	N					GCW	100					
26	M-M/BL Occ B	Business Law	Ian Stirk	16		10	Y	Not running 2018-19				ICW	100					

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRACT – Individual Practical; 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 <sup>3</sup>	Total hours delivered by Visiting Lecturers <sup>4</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>5</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
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27	M-M/LSO Occ B	Leading Sales and Customer Management Organisations	Dr Javier Marcos	16		10	Y					ICW	100					
28	M-M/CPPM Occ B	Major Critical Projects and Programme Management – a Sectoral Approach	TBC	16		10	Y							100 MULTI	GPRES GCW	30 70		
29	M-M/LMF Occ B	Leading and Managing the Family Enterprise	Dr Stephanie Hussels	16		10	Y					GCW	100					
30	M-M/SQM Occ B	Strategic Quality Management	Dr Abdelkader Aoufi	16		10	Y							100 MULTI	GPRES GCW	40 60		
31	MXM/CYB Occ B	Challenges in Creating Organisational Cyber Resilience	Kev Brear	16		10	N					ICW	100					
32	MXM/ORR Occ B	Organisational Resilience	Elmar Kutsch			10	Y					ICW ICW	30 70					
33	MXM/IWB	Independent work-based Project	Elmar Kutsch			10	N					ICW IPROJ	15 85					
33	M-M/IP2 Occ B	Independent Project	Various			20	Y	No longer offered				ICW	100					

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPAC – Individual Practical; 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 <sup>3</sup>	Total hours delivered by Visiting Lecturers <sup>4</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>5</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>6</sup> (%) of independent assessments	Weighting within module of multi-part assessments <sup>7</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>8</sup>	Assessment Submission and/or exam date <sup>9</sup>	Assessment / Exam Retake date
34	M-M/GP1 Occ B	Group Project	Various			10	Y	No longer offered				GCW	100					
35	M-M/GP2 Occ B	Group Project	Various			20	Y	No longer offered				GCW	100					
MBA (Defence)																		
36	MXM/LCM	Leading Change Management in Defence	Dr Ifti Zaidi	20		10	N	January only				GPRES ICW	50 50					
37	MXM/DPPM	Defence Portfolio and Programme Management	Dr Bill Egginton	20		10	N	January only				ICW	100					
38	MXM/DE	Defence Economics and Finance	Prof Ron Matthews	20		10	N	January only				ICW	100					
39	MXM/RDM	Risk and Defence Management	Edith Wilkinson	20		10	N	January only				ICW	100					
40	MXM/IRP	Independent Research Project	Prof Ron Matthews	0		10	N	January only				ICW	100					
MBA (Defence Export)																		
41	R-DMR-LEPDSF Occ B	Legal Ethical and Political Defence Security Frameworks	Prof Ann Fitz-Gerlad	16		10	Y	January only				ICW	100					

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPAC – Individual Practical; GPAC – 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 <sup>3</sup>	Total hours delivered by Visiting Lecturers <sup>4</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>5</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>6</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>7</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>8</sup>	Assessment Submission and/or exam date <sup>9</sup>	Assessment / Exam Retake date
42	R-DMR-DSM Occ B	Defence and Security Marketing	Dr Daniel Prior	16		10	Y	January only				ICW	100					
43	R-DMR-DSO Occ B	Defence and Security Offset	Prof Ron Matthews	16		10	Y	January only				ICW	100					
44	R-DMR-STCC Occ B	Strategic Trade Controls and Compliance	Peter Jolliffe	16		10	Y	January only				ICW	100					

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRACT – Individual Practical; 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.

<b><u>Module code</u></b>	<b><u>Module title</u></b>	<b><u>Course that owns the module</u></b>	<b><u>Other course(s)/ programme(s) that use the module</u></b>
M-M/ENT	Entrepreneurship and New Venture Creation	Master of Business Administration	Master of Business Administration
M-M/STG	Strategic Management	Master of Business Administration	Master of Business Administration
M-M/GME	Global Macroeconomics and Business Environment	Master of Business Administration	Master of Business Administration
M-M/IBA	International Business Assignment	Master of Business Administration	Master of Business Administration
M-M/DMDA	Data Analytics and Decision Making	Master of Business Administration	Master of Business Administration
M-M/ESB	Entrepreneurial Finance for Early Stage Businesses	Master of Business Administration	Master of Business Administration
M-M/EFI	Entrepreneurial Finance for Later Stage Businesses	Master of Business Administration	Master of Business Administration
M-M/IST	International Strategy	Master of Business Administration	Master of Business Administration
M-M/MMA	Managing International Mergers and Acquisitions	Master of Business Administration	Master of Business Administration
M-M/CFS	Corporate Financial Strategy	Master of Business Administration	Master of Business Administration
M-M/SCC	Strategizing in Challenging Contexts	Master of Business Administration	Master of Business Administration
M-M/SHR	Strategic Human Resource Management in the 21st Century	Master of Business Administration	Master of Business Administration
M-M/DVSC	Driving Value Through the Supply Chain	Master of Business Administration	Master of Business Administration
M-M/NBO	Negotiating in Business and Organisations	Master of Business Administration	Master of Business Administration
M-M/BL	Business Law	Master of Business Administration	Master of Business Administration
M-M/LSO	Leading Sales and Customer Management Organisations	Master of Business Administration	Master of Business Administration
M-M/CPPM	Major Critical Projects and Programme Management – a Sectoral Approach	Master of Business Administration	Master of Business Administration
M-M/LMF	Leading and Managing the Family Enterprise	Master of Business Administration	Master of Business Administration
M-M/SQM	Strategic Quality Management	Master of Business Administration	Master of Business Administration
MXM/ORR	Organisational Resilience	Executive Master of Business Administration	Master of Business Administration
R-DMR-LEPDSF	Legal Ethical and Political Defence Security Frameworks	Postgraduate Certificate Defence and Security Export	Executive Master of Business Administration (Defence Export)
R-DMR-DSM	Defence and Security Marketing	Postgraduate Certificate Defence and Security Export	Executive Master of Business Administration (Defence Export)
R-DMR-DSO	Defence and Security Offset	Postgraduate Certificate Defence and Security	Executive Master of Business Administration (Defence Export)

		Export	
R-DMR-STCC	Strategic Trade Controls and Compliance	Postgraduate Certificate Defence and Security Export	Executive Master of Business Administration (Defence Export)

## 7. How are the ILOs assessed?

The programme uses a range of assessment types. In addition to closed book and open book written examinations, students undertake a wide range of projects. Written Assessments of Case Study (WACs) are very valuable learning whereby students working with their teams determine the answer to a question posed around a case study, but then each member of the team must write up an individual report consisting of no more than 1,500 words. The assessment is excellent training for writing business reports under time pressure. A more unusual type of assessment is the simulation. Here students – again working in teams – might be required to build a warehouse or an electrical product – within a limited period of time, where information may be given and/or changed at intervals. Many projects involve working with a company on a live project. Towards the end of the programme there will be the opportunity for some students to work on company based projects or short term internships, assessed through a written report.

### 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. MBA

<b>Award ILOs Module No.</b>	ILO1.	ILO2.	ILO3.	ILO4.	ILO5.	ILO6.	ILO7.	ILO8.	ILO9.	ILO10.	ILO11.
01	IPROJ			IPROJ	IPROJ	IPROJ	IPROJ	IPROJ	IPROJ	IPROJ	
02	EX	EX			ICW						
03		ICW	ICW	ICW							
04	ICW	ICW	GPRES ICW	GPRES ICW	GPRES ICW		GPRES	GPRES			
05		GCW	GCW	GCW	GCW					GCW	
06		GCW	GCW	GCW			GCW	GCW	GCW		GCW
07	EX				EX			EX		EEX	
08	GPRES		GCW	GPRES	GCW		GPRES	GPRES		GPRES	
09	EX	MULTI		EX	EX		MULTI	MULTI			
10				GCW	GCW		GCW				
11	EX					EX		EX			EX
12					EX GPROJ			GPROJ			
13	ICW							ICW	ICW		ICW
14				MULTI	MULTI		MULTI	MULTI			MULTI
15			ICW GCW	ICW			GCW	GCW			
16					ICW		ICW	ICW			ICW
17			ICW	ICW			GCW	GCW			

Award ILOs Module No.	ILO1.	ILO2.	ILO3.	ILO4.	ILO5.	ILO6.	ILO7.	ILO8.	ILO9.	ILO10.	ILO11.
			GCW								
18	GPRES GCW				GPRES GCW		GPRES GCW	GPRES GCW			
19	EX		EX		EX						
20		ICW GCW	ICW GCW	ICW GCW	ICW GCW		ICW GCW	ICW GCW			
21			GPRES GCW	GCW	GCW		GCW GPRES	GCW			
22	ICW	ICW								ICW	ICW
23	ICW	ICW			ICW						ICW
24	ICW	ICW			ICW						ICW
25		GCW	GCW		GCW						
26	ICW				ICW					ICW	
27				ICW	ICW		ICW				
28				MULTI	MULTI						
29			GCW	GCW	GCW			GCW	GCW	GCW	
30		MULTI	MULTI	MULTI						MULTI	
31				ICW	ICW						
32		ICW	ICW	ICW	ICW		ICW				
33		ICW/IPR OJ	ICW/IP ROJ	ICW/IPR OJ	ICW/IP ROJ		ICW/IP ROJ	ICW/IPR OJ			

## B. MBA (Defence)

Award ILOs Module No.	ILO1.	ILO2.	ILO3.	ILO4.	ILO5.	ILO6.	ILO7.	ILO8.	ILO9.	ILO10.	ILO11.
36			ICW GPRES	ICW GPRES	ICW GPRES		ICW GPRES	ICW GPRES			
37			ICW			ICW			ICW	ICW	
38	ICW	ICW	ICW	ICW	ICW						
39		ICW	ICW	ICW				ICW		ICW	
40	ICW	ICW	ICW		ICW				ICW	ICW	

## C. MBA (Defence Export)

Award ILOs Module No.	ILO1.	ILO2.	ILO3.	ILO4.	ILO5.	ILO6.	ILO7.	ILO8.	ILO9.	ILO10.	ILO11.
41				ICW	ICW					ICW	
42		ICW	ICW		ICW		ICW	ICW			
43				ICW	ICW		ICW				
44		ICW	ICW	ICW	ICW		ICW				

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

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

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

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

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

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

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

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

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

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

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



and acted on where appropriate by the Education Committee, Senate, School and University Executives.

New Partnership arrangements are considered in two stages:

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

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

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

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

The list of opportunities available to our MBAs after graduating is extremely wide. Drawing on recent surveys of our graduates the most popular functions were as follows:

General Management  
Engineering and R & D Management  
Consultancy  
Business Development  
Strategy  
Sales/Marketing  
Finance/Accounting  
Operations  
IT Project Management

In addition, a small but growing number of students set-up their own businesses, though this number increases after two to three years post-graduation.

**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:** Expeditionary Warfare Systems Engineering and Technology

**Date of first publication/latest revision:** 5/10/18

**1. What is the course?****Course information**

<b>Course Title</b>	Expeditionary Warfare Systems Engineering and Technology
<b>Course code</b>	MSEWSPTR, PDEWSPTR, PCEWSPTR, SPEWSPTR
<b>Academic Year</b>	2018/19
<b>Valid entry routes</b>	MSc, PgDip, PgCert, Accredited Short Courses
<b>Additional exit routes</b>	PgDip, PgCert
<b>Mode of delivery</b>	Part-time
<b>Location(s)<sup>1</sup> of Study</b>	NSWC Crane, USA
<b>School(s)</b>	Cranfield Defence and Security
<b>Theme</b>	Defence and Security
<b>Centre</b>	Centre for Defence Engineering
<b>Course Director</b>	Prof Amer Hameed
<b>Awarding Body</b>	Cranfield University
<b>Is this an AP Contract course?<sup>2</sup></b>	No
<b>Teaching Institution</b>	Cranfield University
<b>Admissions body</b>	Cranfield University
<b>Entry requirements</b>	Standard University Entry Requirements
<b>UK Qualifications Framework Level</b>	QAA FHEQ level 7 (Masters)
<b>Benchmark Statement(s)</b>	N/A
<b>Registration Period(s) available</b>	Maximum of 5 years for MSc, 4 years for PgDip and 3 years for PgCert

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

<sup>2</sup> AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

<b>Course Start Month(s)</b>	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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### **Institutions delivering the course**

This course is delivered by Centre for Defence Engineering (CDE), Centre for Electronic Warfare and Cyber (CEWC) & Centre for Defence Chemistry (CDC) in Cranfield Defence and Security (CDS) where the research interests include:

various aspects of expeditionary warfare systems such as weapons systems, communication systems, autonomous system, guidance , control , mobility, lethality, survivability and systems integration.

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

CDS is already delivering approximately 40 modules in Shrivenham to both UK Ministry of Defence (MOD) and members of Allied countries/forces in the form of Master of Science programmes for guided weapons (GW), military electronics system engineering (MESE) and gun systems design (GSD). In addition, due to their expertise, CDE has provided consultancies to various government departments in the above areas. The programme (Expeditionary Warfare Systems Engineering and Technology MS) draws inspiration from Vehicle and Weapons Engineering MSc program, which has been running in TARDEC USA for last 18 years. The experience with TARDEC, helped the team to design this program to suite NSWC Crane requirements.

The programme (Expeditionary Warfare Systems Engineering and Technology MS) will be delivered on a part-time basis in the USA DoD establishments (NSWC Crane), in a flexible manner. All the teaching and/or assessment will be provided by the CDE & CEWC. It is a CDS, Cranfield University initiative and the programme has no partners or collaborators. However, it is anticipated that day to day mentoring during the student projects would be provided by respective head of the groups sponsoring the program. This mentoring will be provided under guidance of Cranfield faculty members.

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

### **Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)**

To begin with this course is not accredited by any external bodies. However, course development team plans to submit the programme for accreditation after successful completion of first cohort and as soon as programme has met accreditation criterion.

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

Cranfield University offers this course in order :

- To introduce underpinning technologies and their application in defense systems, as required by the engineers and scientists from the US DoD and industry partners working in the design, development, prototyping, test, evaluation, acquisition and maintenance of Expeditionary Warfare systems.
- To provide graduates with the technical qualities, transferable skills and independent learning ability necessary to make them effective in organizations that design, develop, procure, or operate military expeditionary systems. The graduates will be equipped with skills & knowledge, which will help them move across the organisation both horizontally and vertically.

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 Expeditionary Warfare System Design Study (EWSDS) will be used to build team-working skills and explore the integration and trade-offs required in the design and development of platform, weapon and electronic systems in the current operational context. 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 project /thesis presents the students with the opportunity to gain in-depth knowledge of a particular area of expeditionary systems engineering (80 credits).

This programme is intended for the following range of students:

- Although this is an open course and will be advertised on Cranfield website, it is expected that majority of the delegates will be from US DoD
- Test and evaluation engineers, design and development engineers, manufacturing and industrial engineers, specification engineers, physicists and mathematicians working in the field of Expeditionary Warfare systems.
- Military personnel, civil servants, defence industry, acquisition and procurement staff from DoD.
- Graduates, who intend to take up their career in the 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 Expeditionary Warfare Systems Engineering and Technology**

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

- ILO 1. Develop a comprehensive understanding of engineering principles associated with the expeditionary warfare system including its components and subsystems.
- ILO 2. Appraise and evaluate the key technological disciplines associated with platforms, modern weapons and electronic warfare; and develop justification for performance variations in mechanical & electrical sub-systems that constitute expeditionary warfare system using modelling, simulation and experimental techniques.
- ILO 3. Critically assess the performance, design and integration of expeditionary warfare systems (platforms, weapons & electronic information systems) in the face of conflicting and limited information; and perform design analysis of the expeditionary warfare components and sub-systems using computer-based modelling and simulation techniques; for example: ballistics, weapon system, platform design & performance and electronic warfare systems framework (radars, electro-optics, communication, etc).

#### **B. Postgraduate Diploma in Expeditionary Warfare Systems Engineering and Technology**

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

- ILO 4. Develop appropriate selection criteria for inherently inter-linked constraints for each of the major technical disciplines associated with modern Expeditionary Warfare Systems Engineering and Technology & technology (e.g. signal processing, radar EW, weapon and platform structures, electro-optics and infrared systems, warheads, aeroelasticity, materials, power supplies, explosives, etc.), and create a detailed technical framework on the design, operation and performance of a modern expeditionary warfare system.
- ILO 5. Assess and appraise the principal trade-offs required to produce a successful expeditionary warfare systems design, while critically analysing the threat from Electronic Surveillance (ES) and Electronic Attack (EA) to typical military sensor and information systems. Specifically, the systems include radar, sonar, electro-optic and infrared sensors, communications systems and networks, communications and non-communications EW systems.

### **C. MSc in Expeditionary Warfare Systems Engineering and Technology**

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

- ILO 6. Assess new research ideas, concepts or methodologies through the use of a variety of techniques such as experimentation, analytical models and numerical models in order to perform an extended investigation into a given facet of interest concerning expeditionary warfare systems.
- ILO 7. Formulate a systematic approach with engineering judgement to the design and integration of systems concerning expeditionary warfare in the face of conflicting and limited information using information retrieval, modelling, experimentation and/or theoretical analysis.

## **4. How is the course taught?**

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

The programme will provide students with the technical knowledge and understanding of expeditionary warfare systems to make them effective in specification, design, development and assessment. Special attention will be given to recent advances in global defence technologies, 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. For the students joining midway, if the group size is less than eight, induction program will be organised via combination of global classroom and video lectures.

The taught element of the programme will consist of 12-13 courses (modules) covering major aspects of expeditionary warfare technology, and providing a balanced and broad coverage of key aspects, critical issues and constraints associated with the design, development, performance and integration of expeditionary warfare systems. Where applicable, an optional pre-reading material will be made available via VLE for attendees to freshen up their fundamental back ground knowledge prior to the class.

The modular teaching programme culminates in a design study. This draws together the material taught in the preceding courses and considers a) the technical requirements and characteristics of expeditionary warfare systems and to examine the interactions between the various sub-systems and consequential compromises and trade-offs. b) the technical requirements and characteristics

of Electronic Warfare Systems and to examine the interactions between the various sub-systems and consequential compromises and trade-offs.

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. Where possible, industry will be invited to provide industrial pre-sepective in the form of visiting lecturer/guest speakers

Linking theory to real examples from warfare systems, 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.

Course tuition and project supervision will be undertaken as follows:

- The Centre for Defence Engineering (CDE) plans to visit DoD establishments, with appropriate facilities (NSWC, Crane), 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 supervision each year. This will allow delivery of 13 courses worth 120 credits, and project worth 80 credits.
- During each visit, CDE will send a team of 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 module manager/course director will provide pre-reading material two 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 module pre-reading material is optional and will require no more than 2 -8 hours of private study.
- Each module will consist of lectures to develop better understanding in the students and will be supported by tutorials, (proprietary and/or bespoke videos) laboratory and computer based exercises to explain the application of engineering and applied science using real life examples.
- Depending upon the type of module, written examination and course work assessment will be undertaken. This element will require 40-45 hours of private study. If the module is assessed 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 module delivery, assessment by written examination will be undertaken on the last day of the module. This practice is agreed upon and followed in VWE (USA), hence it will be followed in this program also. More importantly, the administration of the examination process strictly follows the university examination procedures. Although some of the modules are borrowed from VWE course, different examination questions will be set. Coursework feedback will be given to students in accordance with University regulations. Project 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. 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. Where possible, project supervisors will be supported by local mentors. They may provide day to day mentoring but will not participate in assessment/grading.

To develop their confidence in conducting critical engineering analysis and systems evaluation, independent research and learning, students will undertake a group design study (EWSDS).

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 expeditionary warfare system 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
<b>COMPULSORY MODULES:</b>	
n/a	
<b>ELECTIVE MODULES:</b>	
Any 60 credits chosen from modules 1-20	
1. Communication Networks	1. 10
2. Communications Engineering 1	2. 10
3. Fundamentals of Ballistics	3. 10
4. Electro-optics Systems for Expeditionary Warfare 1	4. 10
5. Naval Weapons – Control and Guidance	5. 10
6. Military Autonomous Vehicles	6. 10
7. Fighting Vehicle Design	7. 5
8. Modelling, Simulation and Control for Defence Engineering	8. 5
9. Expeditionary Warfare Systems Design Study	9. 10
<i>(Note: Modules 7 and 8 must be taken as a pair)</i>	
<b>Weapon &amp; Vehicle Specialization</b>	
10. Light Weapon Design	10. 10
11. Naval Weapon Structures, Aeroelasticity, and Propulsion	11. 10
12. Naval Weapons Warheads, Explosives and Propellants	12. 10
13. Weapon Systems Technology	13. 10
14. Military Vehicle Propulsion	14. 10
15. Military Vehicle Dynamics	15. 10
<b>Electronic Specialization</b>	
16. Radar Sensing and EW	16. 10
17. Electro-optics Systems for Expeditionary Warfare 2	17. 10
18. Microwave Systems Engineering for Expeditionary Warfare	18. 10
19. Communications Engineering 2	19. 10
20. Data Processing for EW	20. 10
<b>TOTAL:</b>	60

## B. Postgraduate Diploma

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
n/a	
<b>ELECTIVE MODULES:</b>	
1. Communication Networks	1. 10
2. Communications Engineering 1	2. 10
3. Fundamentals of Ballistics	3. 10
4. Electro-optics Systems for Expeditionary Warfare 1	4. 10
5. Naval Weapons – Control and Guidance	5. 10
6. Military Autonomous Vehicles	6. 10
7. Fighting Vehicle Design	7. 5
8. Modelling, Simulation and Control for Defence Engineering	8. 5
9. Expeditionary Warfare Systems Design Study	9. 10
<i>(Note: Modules 7 and 8 must be taken as a pair)</i>	
<b>Weapon &amp; Vehicle Specialization</b>	
10. Light Weapon Design	10. 10
11. Naval Weapon Structures, Aeroelasticity, and Propulsion	11. 10
12. Naval Weapons Warheads, Explosives and Propellants	12. 10
13. Weapon Systems Technology	13. 10
14. Military Vehicle Propulsion	14. 10
15. Military Vehicle Dynamics	15. 10
<b>Electronic Specialization</b>	
16. Radar Sensing and EW	16. 10
17. Electro-optics Systems for Expeditionary Warfare 2	17. 10
18. Microwave Systems Engineering for Expeditionary Warfare	18. 10
19. Communications Engineering 2	19. 10
20. Data Processing for EW	20. 10
<b>TOTAL:</b>	<b>120</b>

## 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
<b>COMPULSORY MODULES:</b>	
21. Project	21. 80
<b>ELECTIVE MODULES:</b>	
1. Communication Networks	1. 10
2. Communications Engineering 1	2. 10
3. Fundamentals of Ballistics	3. 10
4. Electro-optics Systems for Expeditionary Warfare 1	4. 10



5. Naval Weapons – Control and Guidance	5. 10
6. Military Autonomous Vehicles	6. 10
7. Fighting Vehicle Design	7. 5
8. Modelling, Simulation and Control for Defence Engineering	8. 5
9. Expeditionary Warfare Systems Design Study	9. 10
<i>(Note: Modules 7 and 8 must be taken as a pair)</i>	
<b>Weapon &amp; Vehicle Specialization</b>	
10. Light Weapon Design	10. 10
11. Naval Weapon Structures, Aeroelasticity, and Propulsion	11. 10
12. Naval Weapons Warheads, Explosives and Propellants	12. 10
13. Weapon Systems Technology	13. 10
14. Military Vehicle Propulsion	14. 10
15. Military Vehicle Dynamics	15. 10
<b>Electronic Specialization</b>	
16. Radar Sensing and EW	16. 10
17. Electro-optics Systems for Expeditionary Warfare 2	17. 10
18. Microwave Systems Engineering for Expeditionary Warfare	18. 10
19. Communications Engineering 2	19. 10
20. Data Processing for EW	20. 10
<b>TOTAL:</b>	<b>200</b>

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  $\geq 50\%$ ;
- An average mark of  $\geq 50\%$  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);<sup>3 4</sup>
- **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  $\geq 50\%$  across the taught assessments);

<sup>3</sup> 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).

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

- if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
- it is 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  $\geq 40$  credits, which are not part of the taught assessment average), the pass mark of  $\geq 50\%$  (where they exist);
- **For the thesis**, a mark of  $\geq 50\%$  in order to receive a pass (where it exists).

## 6. How is the course structured?

Part-time students register for the course in June preferably, however students can join the program from any module and are expected to complete the course within 5 years.

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 at DoD establishments in USA. Two modules will be taught per visit with two to three visits per year. The project 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. Each class will consist of maximum of 25 attendees. It is anticipated that some delegates may not be able to attend the modules sequentially due to the operational duties, which will allow additional delegates to register midway. Therefore, the course director will ensure that delegates should be able to complete the taught part within the stipulated time by taking hop-on hop-off approach by utilising the available slots on shared modules on both the VWE (USA) and EWSE programme. The sponsor is keen to increase the potential political value for collaboration across US Navy and Army. This strengthens the argument for economic cost sharing between the two sponsors (NSWC & TARDEC), thereby ensuring the viability and sustainability of the program within DoD. As a result, program has the following eight shared modules:

- Fighting Vehicle Design
- Modelling, Simulation and Control for Defence Engineering
- Military Vehicles Propulsion
- Military Vehicle Dynamics
- Fundamentals of Ballistics
- Light Weapon Design
- Weapon Systems Technology
- Military Autonomous Vehicles

## 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	‘ Residential’ Start Date	‘ Residential’ End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
1	R-EWS-CN	Communication Networks	Phil Nobles	38	0	10	N	11/03/19	25/03/19	29/03/19	50	ICW	100				29/05/19	TBC
2	R-EWS-CE1	Communications Engineering 1	Taufiq Asyhari	38	0	10	N	11/03/19	25/03/19	29/03/19	50			100	EX ICW	50 50	29/03/19 21/05/19	TBC TBC
3	R-VWE-FB	Fundamentals of Ballistics	Derek Bray	38	0	10	Y	12/06/23	26/06/23	30/06/23	50			100	EX ICW	50 50	30/06/23 30/08/23	TBC TBC

<sup>5</sup> Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

<sup>6</sup> Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

<sup>7</sup> 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  $\geq 50\%$ . This will be at the Board of Examiners discretion.

<sup>8</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>9</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>10</sup> 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.

<sup>11</sup> Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

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

Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
4	R-EWS-ESEW	Electro-optics Systems for Expeditionary Warfare – Part 1	Prof Mark Richardson	38	0	10	N	01/05/23	15/05/23	19/05/23	50			100	EX ICW	50 50	19/05/23 19/07/23	TBC TBC
5	R-EWS-NWCG	Naval Weapons – Control and Guidance	Dr John Economou	38	0	10	N	03/05/21	17/05/21	21/05/21	50			100	EX ICW	50 50	21/05/21 21/07/21	TBC TBC
6	R-VWE-MAV	Military Autonomous Vehicles	Dr John Economou	38	0	10	Y	20/04/20	04/05/20	08/05/20	50			100	EX ICW	50 50	08/05/20 08/07/20	TBC TBC
7	R-VWE-FVD	Fighting Vehicle Design	Prof Amer Hameed	38	1	5	Y	22/04/19	06/05/19	10/05/19	50			100	ICW EX	50 50	10/07/19 10/05/19	TBC TBC
8	R-VWE-MSUDE	Modelling, Simulation and Control for Defence Engineering	Dr David Wall	38	0	5	Y	27/03/23	10/04/23	14/04/23	50	ICW	100				14/06/23	TBC
9	R-EWS-EWSDS	Expeditionary Warfare Systems Design Study	Prof Amer Hameed	55	0	10	N	14/11/22	28/11/22	09/12/22	50	ICW	100				09/03/23	TBC
10	R-VWE-LWD	Light Weapon Design	Mr Steve Champion	38	0	10	Y	03/06/19	17/06/19	21/06/19	50			100	ICW EX	50 50	21/08/19 21/06/19	TBC TBC
11	R-EWS-NWSAP	Naval Weapons Structures, Aeroelasticity and Propulsion	Dr Alistair Saddington	38	0	10	N	02/05/22	16/05/22	20/05/22	50			100	EX ICW	50 50	20/05/22 20/07/22	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; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
12	R-EWS-NWWE P	Naval Weapons Warheads, Explosives, Propellants and Materials	Dr Philip Gill	38	0	10	N	14/03/22	28/03/22	01/04/22	50			100	EX ICW	50 50	01/04/22 27/05/22	TBC TBC
13	R-VWE-WST	Weapon Systems Technology	Prof Amer Hameed	38	5	10	Y	06/06/22	20/06/22	24/06/22	50			100	ICW EX	50 50	24/08/22 24/06/22	TBC TBC
14	R-VWE-MVP	Military Vehicles Propulsion	Mr Ajay Kumar	38	0	10	Y	16/03/20	30/03/20	03/04/20	50			100	EX ICW	50 50	03/04/20 04/06/20	TBC TBC
15	R-VWE-MVD	Military Vehicle Dynamics	Mr Ajay Kumar	38	0	10	Y	07/06/21	21/06/21	25/06/21	50			100	ICW EX	50 50	25/08/21 25/06/21	TBC TBC
16	R-EWS-RSEW	Radar Sensing and EW	Mr Ioannis Vagias	38	0	10	N	08/03/21	22/03/21	26/03/21	50			100	EX ICW	50 50	26/03/21 26/05/21	TBC TBC
17	R-EWS-ESEW2	Electro-optics Systems for Expeditionary Warfare – Part 2	Prof Mark Richardson	38	0	10	N	18/11/19	02/12/19	06/12/19	50	ICW	100				09/03/20	TBC
18	R-EWS-MSEW	Microwave Systems Engineering for Expeditionary Warfare	Dr Ivor Morrow	38	0	10	N	19/11/18	03/12/18	07/12/18	50			100	ICW EX	50 50	07/03/19 07/12/18	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; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
19	R-EWS-CE2	Communications Engineering 2	Peter Barker	38	0	10	N	16/11/20	30/11/20	04/12/20	50			100	EX ICW	50 50	04/12/20 04/03/21	TBC TBC
20	R-EWS-DPEW	Data Processing for EW	Dr Venkat Sastry	38	0	10	N	15/11/21	29/11/21	03/12/21	50			100	EX ICW	50 50	03/12/21 03/03/22	TBC TBC
21	R-EWS-DISS	Project	Prof Amer Hameed	20		80			08/04/22	08/04/23	50	THESIS	100				08/04/23	

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

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

<u>Module code</u>	<u>Module title</u>	<u>Course that owns the module</u>	<u>Other course(s)/ programme(s) that use the module</u>
R-VWE-FB	Fundamentals of Ballistics	Vehicle and Weapon Engineering, USA	Expeditionary Warfare Systems Engineering & Technology, USA
R-VWE-MAV	Military Autonomous Vehicles	Vehicle and Weapon Engineering, USA	Expeditionary Warfare Systems Engineering & Technology, USA
R-VWE-FVD	Fighting Vehicle Design	Vehicle and Weapon Engineering, USA	Expeditionary Warfare Systems Engineering & Technology, USA
R-VWE-MSDE	Modelling, Simulation and Control for Defence Engineering	Vehicle and Weapon Engineering, USA	Expeditionary Warfare Systems Engineering & Technology, USA
R-VWE-LWD	Light Weapon Design	Vehicle and Weapon Engineering, USA	Expeditionary Warfare Systems Engineering & Technology, USA
R-VWE-WST	Weapon Systems Technology	Vehicle and Weapon Engineering, USA	Expeditionary Warfare Systems Engineering & Technology, USA
R-VWE-MVP	Military Vehicle Propulsion	Vehicle and Weapon Engineering, USA	Expeditionary Warfare Systems Engineering & Technology, USA
R-VWE-MVD	Military Vehicle Dynamics	Vehicle and Weapon Engineering, USA	Expeditionary Warfare Systems Engineering & Technology, USA

## 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 because:

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**

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**

<b>Award ILOs</b>			
<b>Module No.</b>	<b>ILO1</b>	<b>ILO2</b>	<b>ILO3</b>
1	ICW	ICW	ICW
2	EX ICW	EX ICW	EX ICW
3	EX ICW	EX ICW	EX ICW
4	EX ICW		EX ICW
5	EX ICW	EX ICW	EX ICW
6	EX ICW	EX ICW	EX ICW
7	EX ICW		EX ICW
8	ICW	ICW	ICW
9	ICW	ICW	ICW
10	EX ICW		EX ICW
11	EX ICW	EX ICW	EX ICW
12	EX ICW	EX ICW	
13	EX ICW	EX ICW	EX ICW
14	EX ICW	EX ICW	
15	EX ICW	EX ICW	EX ICW
16	EX ICW	EX ICW	EX ICW
17	ICW	ICW	ICW
18	EX ICW	EX ICW	EX ICW
19	EX ICW	EX ICW	EX ICW
20	EX ICW	EX ICW	EX ICW

## B. Postgraduate Diploma

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

<b>Award ILOs</b>		
<b>Module No.</b>	<b>ILO4</b>	<b>ILO5</b>



<b>Award ILOs</b> <b>Module No.</b>	<b>ILO4</b>	<b>ILO5</b>
1		ICW
2	EX ICW	EX ICW
3		EX ICW
4	EX ICW	
5	EX ICW	EX ICW
6	EX ICW	EX ICW
7		EX ICW
8		ICW
9	ICW	ICW
10	EX ICW	EX ICW
11	EX ICW	EX ICW
12	EX ICW	
13	EX ICW	EX ICW
14	EX ICW	EX ICW
15	EX ICW	EX ICW
16	EX ICW	EX ICW
17	ICW	ICW
18	EX ICW	
19	EX ICW	EX ICW
20	EX ICW	

### C. MSc

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

<b>Award ILOs</b> <b>Module No.</b>	<b>ILO6</b>	<b>ILO7</b>
1	ICW	ICW

<b>Award ILOs</b> <b>Module No.</b>	<b>ILO6</b>	<b>ILO7</b>
2	EX ICW	
3		EX ICW
4	EX ICW	
5	EX ICW	EX ICW
6	EX ICW	
7		EX ICW
8	ICW	ICW
9	ICW	ICW
10		
11		EX ICW
12		
13	EX ICW	
14		EX ICW
15		EX ICW
16	EX ICW	EX ICW
17		ICW
18	EX ICW	EX ICW
19	EX ICW	
20	EX ICW	EX ICW
21	THESIS	THESIS

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

<b>Title</b>	<b>Modules Covered</b>	<b>Assessment</b>	
		<b>Type</b>	<b>Weight (%)</b>
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?**

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 warfare system design, researchers and analysts working in the design and development of expeditionary warfare system
- Graduates, who intend to take up a career in defence technology (DoD and industry)
- Military personnel, government civil servants, defence industry, acquisition and procurement staff from DoD

This program will provide the following skills:

- Cement and consolidate industrial experience with the relevant technical background to enable decision making.
- Expand and enhance knowledge of the subjects taught to apply this within your current role.
- Develop and enhance analysis of systems in their current roles.
- Blend industry standards with modern, novel and cutting edge techniques.
- Multidisciplinary knowledge in expeditionary warfare enables improved communication between experts in different fields, and enable the employee to take up managerial responsibilities over teams of staff in these areas.
- Education gained from the Ex War SE program develops knowledge to enable the employee to be a smart customer.
- Knowledge gained from this program gives attendees the capability to work between Naval and Army Command.)

## **COURSE SPECIFICATION**

### **Cranfield University: Course Specifications**

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

**COURSE TITLE:** MSc in Explosives Ordnance and Engineering

**Date of first publication/latest revision:** 24/7/18

### **1. What is the course?**

#### **Course information**

<b>Course Title</b>	Explosives Ordnance and Engineering
<b>Course code</b>	MSEOFETR, MSEOEPTR, PDEOFETR, PDEOEPTR, PCEOFETR, PCEOEPTR
<b>Academic Year</b>	2018-19
<b>Valid entry routes</b>	MSc, PgDip, PgCert
<b>Additional Exit routes</b>	PgDip, PgCert
<b>Mode of delivery</b>	Full-time and Part-time
<b>Location(s)<sup>1</sup> of Study</b>	Shrivenham
<b>School(s)</b>	Cranfield Defence and Security
<b>Theme</b>	Defence and Security
<b>Centre</b>	Centre for Defence Chemistry
<b>Course Director</b>	Mrs T Temple
<b>Awarding Body</b>	Cranfield University
<b>Is this an AP Contract course?<sup>2</sup></b>	Yes
<b>Teaching Institution</b>	Cranfield University
<b>Admissions body</b>	Cranfield University
<b>Entry requirements</b>	Degree in science or science related subject or exceptionally with at least 10 years relevant experience. If you are entering the Masters programme through the experiential route, then up to three successful completions of EOE modules can be used as part of the case to provide supporting evidence of academic ability for entry onto the EOE. IELTS score of 7.0 required by students for whom

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

<sup>2</sup> AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

	English is not a first language
<b>UK Qualifications Framework Level</b>	QAA FHEQ level 7 (Masters)
<b>Benchmark Statement(s)</b>	N/A
<b>Registration Period(s) available</b>	Full-time MSc, PgDip, PgCert – 1 year Part-time PgCert – 3 years, PgDip – 4 years and MSc 5 Years.
<b>Course Start Month(s)</b>	September (full-time/part-time)

### **Institutions delivering the course**

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

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

### **Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)**

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

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

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

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

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

The course also aims to enable students to:

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

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

This programme is intended for the following range of students:

- Military UK and International, (Army, RN, RAF)
- Civil services

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

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

##### **A. Postgraduate Certificate**

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

- ILO 1. A systematic application and a critical understanding of current research at the forefront of explosives and explosives ordnance engineering, together with the capacity to evaluate its relevance to industrial and commercial practice
- ILO 2. Conceptual thinking that enables the student to evaluate critically current research and methodologies, develop critiques of them and adapt them in the context of both advanced scholarship and industrial, commercial, and professional relevance, using many of the analytical procedures within the armoury of the explosive engineer or scientist
- ILO 3. An ability to acquire and use information effectively in any appropriate medium, including the increasing range of networked information resources from a wide range of adjacent disciplines in engineering, physical and forensic sciences that impact on explosive ordnance engineering
- ILO 4. Originality in the application of knowledge, including data and information collected by the student in relation to essays focusing on explosives and explosives ordnance engineering
- ILO 5. To be able to compile, reduce and sort a large body of information, from a variety of sources, to critically examine and analyse this information and communicate, with clarity, pertinent information derived from these sources, which manifests as new material (in that it is greater than the sum of the parts of the material assimilated)
- ILO 6. Self-direction and originality in tackling and solving problems, working effectively at a professional level making informed judgements in the absence of complete data and communicating conclusions clearly, both orally and in writing, to specialist and non-specialist audiences

##### **B. Postgraduate Diploma**

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

- ILO 7. Peer review, grading and prioritisation of presented work against a clear assessment framework; an indispensable ability because funding for any endeavour is likely finite.

## C. MSc

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

- ILO 8. Originality in the application of knowledge, including data and information collected by the student in relation to an extended individual project focusing on explosives and explosives ordnance engineering
- ILO 9. A critical ability and originality of thought through the planning and execution of a detailed research project and present the outcomes and conclusions in an oral format to a variety of audiences
- ILO 10. An ability to critically review established explosive ordnance engineering practice in a particular field, write a clear explanation of experimental/analytical procedures and the presentation of results by appropriate means, and present a self-critical discussion of experimental/analytical results with conclusions that place the research in the context of the professional practice in explosive ordnance engineering
- ILO 11. Experience in writing Safe Operating Procedures and COSHH and methods of securing health and safety data from a variety of sources

## 4. How is the course taught?

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

- Technology School TS a facility, which presents defence technology-related educational material in an integrated approach, under one roof, using modern delivery methods in order to enhance defence technology education capabilities. The Defence Academy is the only educational establishment in the UK with the means to do this and is thus ideally placed to develop and champion higher level thinking. The TS has at its heart an integrated education system which enables students to access the full range of educational, experimentation and research material across all domains. To help achieve this it is equipped with a wealth of real (operational) military hardware including, for example, tanks, guns, armoured vehicles, rockets, ammunition and protective personal equipment. Teaching in this environment enables the students unprecedented hands-on learning, which cannot be achieved in a 'lecture-room-and-slides' environment.
- Poster generation and presentation: Here students are given a necessarily vague title for a topic and asked to produce an A0 size poster within three hours. The students work in groups of five and are given minimal instruction. Students must work in an unfamiliar area, where the only direction is from their initiative, teamwork and communication skills and computational search abilities. Students are then asked to criticise each other's posters with three positive points and three negative points. This is to help students acclimatise to the 'research environment', where there is no 'correct answer' and direction must be self-driven. This helps students capture and illustrate 'M-level descriptors' associated with a Master's program as distinct from a first degree.
- Thought experiments: A particular scenario is given and the students describe how they might perform an experiment to understand a particular phenomenon. The 'results' of the experimentation chosen are predicted by the lecturer based upon knowledge. Analysis and



understanding models then predicted by the student and moulded/ adjusted to conform to current accepted models of understanding. Such methods are valuable in areas such as explosives where direct experimentation is difficult, not possible or too dangerous.

- Computational experiments: Students have the opportunity to perform computer simulations (rather than experimentation) of various areas. For example, they will be asked to use a computer code to simulate blast from an explosive in a busy street and predict possible outcomes. Specifically they are requested to use the simulation codes to explore the possibilities and capabilities. This is necessarily slow, and sometimes frustrating, but it provides the students with insight into the simulation arena and its inherent limitations; 'the computer answer is not always correct'. This is supplemented with case studies to show the full scope and capability of the codes if they were to be used by experienced 'expert' users.
- Peer review and prioritisation: Funding for any endeavour is finite and therefore our students will, in their future roles, need to arbitrate upon projects/endeavours that are to be funded and those that are not to be funded. To further develop this important skill, students are asked in groups to carry out 'horizon scanning' – exploring future developments in the EOE arena. They will then present orally their findings to the whole course. Individually, students will then 'peer review' and grade each of the proposed new areas against a clear assessment framework. Finally, they will prioritise each of the proposed areas against their chosen criterion, with the top 30% being (hypothetically) funded. This will furnish students with the knowledge and associated challenges of prioritisation. It will also help them empathise with how, for example, courses are run and structured.
- Immersion in a working testing laboratory: Many laboratory based teaching environments are simulants of in-practice 'industrial' working, which can prove limited in the dissemination of 'real-world' practices. Here, we immerse students into a working testing laboratory. Rather than use downscaling of particular tests in a central laboratory, students will be introduced and educated in a working testing environment. Here they will be better able to appreciate constraints of, for example, size, time, equipment, safety procedures, management, planning, preparation and reporting.
- Research project: Most projects are practically driven and require extensive use of (explosive) range and specialist laboratory facilities. Here students will liaise with technicians and other supporting staff (including supervisors). Planning, logistical and time management skills are crucial to offset range availability, cost and difficulty associated with sourcing explosive materials. Also the need to convince, enthuse and inspire supporting staff of the approach is a valuable skill that will help drive the project. Here safety protocols must be carefully written, argued and communicated to convince liaising staff that it is safe to participate and ultimately allow the proposed programme of work. All these challenges reflect conditions in a professional environment.

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

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

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

### **A. Postgraduate Certificate**

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Research Methodology	5
Introduction to Explosives	5
Manufacture and Materials Properties of Explosives	10
Munitions & Target Response	20
Delivery Systems	10
<b>ELECTIVE MODULES (select 10 credits):</b>	
Gun Propellants	10
Transitions to Detonations	5
Testing and Evaluation of Explosives	5
Computer Modelling Tools in EOE	5
Design for Munitions Safety	5
Risk, Assessment for Explosives	5
Rocket Motors and Propellants	10
Introduction to Pyrotechnics	5
Advanced Pyrotechnics	5
Explosives and the Environment	5
Commercial Explosives	10
<b>TOTAL:</b>	<b>60</b>

## B. Postgraduate Diploma

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Research Methodology	5
Introduction to Explosives	5
Future Developments: scanning the horizon in EOE	15
Manufacture and Materials Properties of Explosives	10
Munitions & Target Response	20
Delivery Systems	10
Gun Propellants	10
Transitions to Detonations	5
Testing and Evaluation of Explosives	5
Computer Modelling Tools in EOE	5
Introduction to Pyrotechnics	5
<b>ELECTIVE MODULES (select 25 credits):</b>	
Design for Munitions Safety	5
Risk, Assessment for Explosives	5
Rocket Motors and Propellants	10
Advanced Pyrotechnics	5
Explosives and the Environment	5
Commercial Explosives	10
<b>TOTAL:</b>	<b>120</b>

## 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
<b>COMPULSORY MODULES:</b>	
Research Methodology	5
Introduction to Explosives	5
Future Developments: scanning the horizon in EOE	15
Manufacture and Materials Properties of Explosives	10
Munitions & Target Response	20
Delivery Systems	10
Gun Propellants	10
Transitions to Detonations	5
Testing and Evaluation of Explosives	5
Computer Modelling Tools in EOE	5
Introduction to Pyrotechnics	5
Project	80
<b>ELECTIVE MODULES: (select 25 credits)</b>	
Design for Munitions Safety	5
Risk, Assessment for Explosives	5
Rocket Motors and Propellants	10
Advanced Pyrotechnics	5
Explosives and the Environment	5
Commercial Explosives	10
<b>TOTAL:</b>	<b>200</b>

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  $\geq 50\%$ ;
- An average mark of  $\geq 50\%$  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);<sup>3 4</sup>

<sup>3</sup> 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).

<sup>4</sup> Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of  $< 40\%$  (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than

- **For Taught Assessments**, the minimum mark for each individual taught assessment 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  $\geq 50\%$  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  $\geq 40$  credits, which are not part of the taught assessment average), the pass mark of  $\geq 50\%$  (where they exist);
- **For the thesis**, a mark of  $\geq 50\%$  in order to receive a pass (where it exists).

## 6. How is the course structured?

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

Part-time students register for the course in September and are required to attend the pre-requisite module Introduction to Explosives. Students that attend the Introduction to Explosives module in April will initially be registered as a short course for credit student and will be able to transfer their registration to a named award the following September. The maximum registration period for the Part-Time MSc programme is five years. PgCert and PgDip registrations should be over maximum periods of three and four years respectively.

The taught phase for each 10-credit module is completed within one week, the following week is usually kept free of structured teaching to allow time for more independent learning and reflection for Full-time students. Most industrial visits, if appropriate, are also scheduled for the second week, Part-Time are students offered the opportunity to attend. The main exception is the Future Developments module which runs from October to March/April (part-time students must have completed at least half of the taught phase before they enrol for this module).

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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 <sup>1</sup>	Total hours delivered by Visiting Lecturers <sup>2</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>3</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission Dates	
												Type of Assessment	Weighting within module <sup>4</sup> (%) of independent assessments	Weighting within module of multi-pa assessments <sup>5</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment	Assessment submission and/or examination date	Assessment/Exam Retake date
1	R-EOS-IS	Introductory Studies	C. Williams	62	0	0	N	3/9/18	3/9/18	14/9/18	N/A	AO	N/A				N/A	
2	R-EOS-RM1	Research Methodology	T. Temple	8	0	5	N	24/9/18	24/9/18	24/9/18	40	ICW	100				7/1/19	
3	R-EOS-IE	Introduction to Explosives	T. Temple	30	0	5	N	17/9/18	17/9/18	21/9/18	50	EX	100				26/10/18	14/1/19
								22/4/19	29/4/19	3/5/19	50	EX	100				31/5/19	9/7/19
4	R-EOS-FDSHE	Future Developments: scanning the Horizon in EOE	T. Temple P. Gill	20	0	15	N	30/10/18	30/10/18	30/10/18	50	GPRES ICW OR	25 25 50				21/1/19 18/2/19 9/4/19 SUB 16-17/4/19 EX	3/4/19 2/7/19

5	R-EOS-MTR	Munitions & Target Response	A. Helliker & R. Critchley	66	0	20	N	17/9/18	8/10/18	19/10/18	40	EX GPRES ICW	40 20 40				11/12/18 19/10/18 20/11/18	11/3/19
6	R-EOS-MMPE	Manufacture and Material Properties of Explosives	L. Dossi	26	4	10	N	26/11/18	26/11/18	30/11/18	40	OR	100				11/1/19 PRES SUB 15-17/1/19 OR	26/3/18
7	R-EOS-CMT	Computer Modelling Tools in EOE	C. Knock	15	0	5	N	2/10/18	2/10/18	4/10/18	40	OR	100				20-22/11/18	11/2/19
8	R-EOS-AS2	Delivery Systems	D. Bray	30	0	10	N	5/11/18	5/11/18	9/11/18	40	EX	100				13/12/18	13/2/19
9	R-EOS-GPIBWT	Gun Propellants	M. Moniruzzaman	34		10	N	2/1/19	7/1/19	11/1/19	40	EX GPRES	85 15				15/2/19 11/1/19	29/5/19 20/3/19
10	R-EOS-TD	Transitions to Detonation	N. Mai & L. Humphries	14	3	5	N	28/1/19	28/1/19	30/1/19	40	ICW	100				5/3/19	21/5/19
11	R-EOS-RAE	Risk, Assessment for Explosives	M. Ladyman	14	0	5	N	30/1/19	30/1/19	1/2/19	40	ICW	100				7/3/19	28/5/19
12	R-EOS-TEE	Testing and Evaluation of Explosives	T. Lawrence	20	3	5	N	4/2/19	4/2/19	6/2/19	40	ICW	100				27/3/19	30/5/19
13	R-EOS-RMP	Rocket Motors and Propellants	P. Gill	28	4-6	10	Y	21/1/19	18/2/19	22/2/19	40	EX	100				18/3/19	25/4/19
14	R-EOS-IP	Introduction to Pyrotechnics	R. Vrcelj	13		5	N	18/2/19	25/2/19	27/2/19	40	EX	100				28/3/19	1/5/19
15	R-EOS-AP	Advanced Pyrotechnics	R. Vrcelj	13		5	N	27/2/19	27/2/19	1/3/19	40	ICW	100				4/4/19	4/6/19
16	R-EOS-EE	Explosives and the Environment	T. Temple	16		5	N	13/3/19	13/3/19	15/3/19	40	ICW	100				23/4/19	25/6/19
17	R-EOS-CE	Commercial Explosives	M. Moniruzzaman	30		10	N	4/3/19	4/3/19	8/3/19	40	EX	100				9/4/19	11/6/19
18	R-EOS-DMS	Design for Munitions Safety	S Gaulter	15		5	N	11/3/19	11/3/19	13/3/19	40	ICW	100				30/4/19	28/6/19

19	R-EOE-DISS	Project Full-Time (A18)	T. Temple	40		80	N	N/A	12/4/19	26/7/19	50	ORAL	25				11/7/19	
		Project Part-Time (B18)							12/4/19	26/7/19		THESIS	75				26/7/19	
									27/7/18	26/7/19		ORAL	25				11/7/19	
												THESIS	75				26/7/19 or end of Registration if sooner	

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

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

## 7. How are the ILOs assessed?

The course uses a range of assessment types. Students can expect to have (25%) written examinations, (75%) assessment within their compulsory phase. Presentation/viva are also used as mechanisms for assessment, the relative proportion of marks allocated to these methods of assessment will depend upon the chosen route (option). Explanations of some of the more unusual forms of assessment are provided below:

Short notice briefing: two days given to research a particular theme and write a report (free format)

- Witness statement: prepare a document that conforms to the exacting standards and style required for this discipline,
- Qualitative risk assessment: prepare a document based upon a particular activity that conforms to the Cranfield University model of risk analysis and assessment,
- Literature review: explore and discuss a fully referenced critical analysis of open source literature pertaining to a particular theme in explosives ordnance engineering,
- Peer review and short-notice prioritisation (detailed above).

These approaches have been used to 'simulate' activities likely to be expected of students in their future careers. With academic guidance and critique, students will be better equipped to deliver high quality work in future scenarios.

## Assessment and ILO Mapping

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

### A. Postgraduate Certificate

<b>Award ILOs Module No.</b>	<b>ILO 1</b>	<b>ILO 2</b>	<b>ILO 3</b>	<b>ILO 4</b>	<b>ILO 5</b>	<b>ILO 6</b>	<b>ILO 7</b>
2	ICW	ICW	ICW	ICW		ICW	
3					EX		
5	EX/IC W	EX/IC W	GPRES	ICW	ICW/G PRES	ICW/G PRES	



6	OR	OR			OR	OR	
7	OR	OR	OR	OR	OR	OR	
8	EX	EX			EX	EX	
9	EX/GP RES	EX/GP RES	EX	EX	EX/GP RES	GPRES	
10	ICW	ICW	ICW	ICW	ICW	ICW	
12	ICW	ICW	ICW		ICW	ICW	
11	ICW	ICW	ICW	ICW	ICW	ICW	
13	EX	EX	EX		EX		
14			EX			EX	
15							
16	ICW			ICW	ICW	ICW	
17	EX			EX		EX	
18	ICW		ICW	ICW		ICW	

## B. Postgraduate Diploma

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

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

## C. MSc

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

Award ILOs Module No.	ILO 8	ILO 9	ILO 10	ILO 11
19	THESIS	THESIS	THESIS	THESIS

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

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

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

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

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

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

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

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

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

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

New Partnership arrangements are considered in two stages:

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

B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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

This course provides the advanced academic background necessary to contribute effectively to technically demanding projects in the field of explosives and explosives ordnance engineering. Accordingly, opportunities exist for the armed services, defence industry, government servants and civilians in areas spanning: explosive synthesis; manufacture and quality assurance; security; risk, hazard and safety; explosive related forensics; terrorism; demolition; environmental; nuclear materials; fireworks and display; rocket/gun propellants and weapon design, together with explosives related academic disciplines.

## **COURSE SPECIFICATION**

### **Cranfield University: Course Specifications**

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

**COURSE TITLE:** MSc in Finance and Management

**Date of first publication/latest revision:** June 2018

#### **1. What is the course?**

##### **Course information**

<b>Course Title</b>	MSc in Finance and Management
<b>Course code</b>	MSFNMFTC, PDFNMFTC, PCFNMFTC, MSFMOFTC, MSFMOPTC
<b>Academic Year</b>	2018/19
<b>Valid entry routes</b>	MSc
<b>Additional exit routes</b>	PgDip and PgCert
<b>Mode of delivery</b>	Full-time, Part-time (Muscat only)
<b>Location(s)<sup>1</sup> of Study</b>	Cranfield Campus and Muscat University, Oman
<b>School(s)</b>	School of Management
<b>Theme</b>	Leadership and Management
<b>Centre</b>	Policy, Sustainability and Performance
<b>Course Director</b>	Dr Andrea Moro and Dr Yacine Belghitar
<b>Awarding Body</b>	Cranfield University
<b>Is this an AP Contract course?<sup>2</sup></b>	No
<b>Teaching Institution</b>	Cranfield University
<b>Admissions body</b>	Cranfield University
<b>Entry requirements</b>	Equivalent of a UK 2.2 degree or with at least 5 years of relevant experience
<b>UK Qualifications Framework Level</b>	QAA FHEQ level 7 (Masters)
<b>Benchmark Statement(s)</b>	N/A
<b>Registration Period(s) available</b>	Full-time MSc – one year, Part-time MSc – up to three years (Muscat only)

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

<sup>2</sup> AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

<b>Course Start Month(s)</b>	September
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### **Institutions delivering the course**

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

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

Teaching/instruction from external academic, industry and other guest speakers  
Individual thesis or company based project.

To develop the above /company based projects our intention is to outsource this function to a specialist company and to support this with an administrator to manage the relationship between the university and the students.

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

### **Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)**

This course is not formally accredited by any external bodies.

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

Cranfield University offers this course in order to:

- To prepare students for a career in financial services
- To provide students with a high level of financial skills
- To give students a rounded view of business and its management

This programme is intended for the following range of students:

- Students with good numerate skills
- Young students seeking to develop their understanding of Finance
- Students seeking to work in finance-related services

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

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

#### **A. Postgraduate Certificate**

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

- ILO 1. An ability to demonstrate a basic knowledge and understanding of key corporate finance and management issues.
- ILO 2. An ability to understand and use accounting and financial information effectively.
- ILO 3. An independent learning ability and developing key finance and management skills required for decision making.
- ILO 4. Understanding and solving financial problems.
- ILO 5. Working effectively both individually and in teams.
- ILO 6. Making informed judgements using data analysis.

- ILO 7. Development of core finance and management skills necessary for employment in finance sector.

## **B. Postgraduate Diploma**

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

- ILO 8. A systematic application and a critical awareness of current research and key issues in finance together with the capacity to evaluate its relevance to practice.
- ILO 9. A conceptual understanding that enables the student to evaluate contemporary issues and methods for financial analysis and, where appropriate, adapt them in the context of both advanced scholarship and their selected elective subjects.
- ILO 10. An ability to acquire and use information effectively in any appropriate medium, including the increasing range of analytical tools for financial decision making.
- ILO 11. An independent learning ability and interest in advancing their knowledge and understanding and developing new financial and management skills to a high level.
- ILO 12. Self-direction and originality in understanding and solving problems.
- ILO 13. Originality in the application of firm valuation and application of basic financial modeling for practical decision making.
- ILO 14. Working effectively both individually and in teams.
- ILO 15. Development of advanced finance and management skills necessary for employment in finance sector.

## **C. MSc**

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

- ILO 16. Demonstrate a systematic understanding of key areas in finance and the foundations of management.
- ILO 17. Undertake qualitative and quantitative research studies of a specialist nature drawing on appropriate empirical tests and the relevant financial research literature.
- ILO 18. Analyse and apply financial information effectively in key decision-making areas in capital markets, financial institutions and at the corporate level.
- ILO 19. Work effectively, both individually and in teams, to solve financial and managerial problems in domestic and international finance, and communicate conclusions clearly, to specialist and non-specialist audiences.
- ILO 20. Undertake a company based project to apply the knowledge gained in the MSc with an aim to offer recommendations for real world problem faced by the company.

## **4. How is the course taught?**

Overall the aim is to provide a varied, stimulating and experiential learning environment. All taught modules consist of formal lectures, in-class discussions, group and self-study. Group project work, reflective practice and class exercises are used to develop problem solving skills. The course will be supported by an electronic learning environment (VLE - Blackboard) which will be the central repository for all information relating to the course and available to the students at all times. This will be supplemented by online module case packs. Additional practical expertise will be provided by visiting fellows and guest speakers. Each core module comprises 20 hours of class contact time with a further 80 hours of study time to consolidate learning and carry out

assignments, giving 100 notional learning hours per module. Each elective module has 50 notional hours consisting of 15 class contact hours and a further 35 private study hours. The thesis component of the module is a total of 80 credits.

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

- Lectures
- Group work and presentations
- Modelling and programming
- Research-based thesis or a company based project

Programming and modelling enable students to access important databases on companies and capital markets and use the necessary software programmes for carrying out modelling. Simulated games give students a realistic view of how negotiations are carried in corporate transactions and how decisions affect firm value.

In addition to the teaching methods outlined above, students are supported in their learning and personal development by extensive use of Blackboard as a means of delivering material to support and augment classroom learning.

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

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

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

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

#### A. MSc

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Modules 1-10	100
Thesis - 24	80
<b>ELECTIVE MODULES:</b>	
4 modules from 11-23	20
<b>TOTAL:</b>	<b>200</b>

### Finance and Management (Muscato) (Full-time and Part-time)

#### B. MSc

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

Description	Credits
<b>COMPULSORY MODULES:</b>	

Modules 1-10	100
Thesis - 22	80
<b>ELECTIVE MODULES:</b>	
4 modules from 11, 13-15, 17	20
<b>TOTAL:</b>	<b>200</b>

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  $\geq 50\%$ ;
- An average mark of  $\geq 50\%$  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);<sup>3 4</sup>
- **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  $\geq 50\%$  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  $\geq 40$  credits, which are not part of the taught assessment average), the pass mark of  $\geq 50\%$  (where they exist);
- **For the thesis**, a mark of  $\geq 50\%$  in order to receive a pass (where it exists).

## 6. How is the course structured?

<sup>3</sup> 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).

<sup>4</sup> 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 September and are expected to complete the course within 12 calendar months.

The part-time course is structured over two years as follows:

- In Year 1 there are five mandatory modules
- In Year 2 there are four mandatory modules and the students also undertake an individual thesis project

## Course modules

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

### Finance and Management (Cranfield)

Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment								
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates		
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date	
		TERM 1																	
1	M-F/COF	Corporate Finance	Dr Yacine Belghitar	20		10	Y		1/01/2018	6/11/2018	40	EX	100				10/12/2018	TBC	
2	M-F/SAF	Statistical Analysis in Finance	Nemanja Radic	20		10	Y		4/10/18	27/11/18	40 40	GCW EX	40 60				20/12/2018 11/12/20	TBC	

<sup>5</sup> Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

<sup>6</sup> Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

<sup>7</sup> 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  $\geq 50\%$ . This will be at the Board of Examiners discretion.

<sup>8</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>9</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>10</sup> 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.

<sup>11</sup> 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; IPRACT – Individual Practical; 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
																	18	
3	M-F/ACC	Accounting	Dr Matthias Nnadi	20	6	10	Y		3/10/18	28/11/18	40 40	EX EX	25 75				13/11/2018 12/12/2018	TBC
4	M-F/ECO	Economics for Financial Markets	Dr Constantinos Alexiou	20		10	Y		1/10/18	27/11/18	40	EX	100				8/01/2019	TBC
5	M-F/ORG	Organisational Management	Valentina Battista	20		10	Y		2/10/18	27/11/18	40	ICW	100				18/12/2018	TBC
		<b>TERM 2</b>																
6	M-F-STR	Strategic Management	Dr Richard Schoenberg	20		10	N		09/01/2019	11/03/2019	40	EX	100				15/03/2019	TBC
7	M-F/ICF	International Corporate Finance	Prof Sunil Poshakwale	20		10	N		09/01/2019	19/02/2019	40 40	GPRAC EX	25 75				15/03/2019	TBC
8	M-F/VFM	Valuation and Financial Modelling	Dr Vineet Agarwal	20		10	Y		7/01/2019	06/02/2019	40 40	GCW EX	50 50				15/03/2019	TBC

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRACT – Individual Practical; 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
9	M-F/FMRE	Financial Markets, Regulation and Ethics	Dr Walter Gontarek	20	14 / 6	10	Y		9/01/2019	27/02/2019	40 40	IPRAC	70	MULTI 30	GPres GPres	15 15	29/01/19 26/02/19 27/02/19	TBC
10	M-F/RMF	Research Methods in Finance	Dr Vineet Agarwal	20		10	Y		5/02/2019	6/03/2019	40 40	GPRES ICW	30 70				15/03/2019	TBC
		TERM 3 (Electives – choose any 4)																
11	M-F/CRS	Corporate Restructuring	Dr Yacine Belghitar	15		5	Y		13/4/19	9/5/2019	40	ICW	100				21/6/2019	TBC
12	M-F/BDM	Bigdata Management and Cybersecurity	Dr Andrea Moro	15		5	Y		11/04/2019	21/06/2019	40	ICW	100				21/6/2019	TBC
13	M-F/IFF	Infrastructure Finance	Ian Alexander	15		5	Y		11/4/19	02/05/2019	40	EX	100				21/6/2019	TBC
14	M-F/BSC	Blockchain, Cryptocurrencies, and Small Contracts	Dr Andrea Moro	15		5	Y		11/04/2019	02/05/2019	40	ICW	100				21/6/2019	TBC
15	M-F/ENF	Entrepreneurial Finance	Dr Andrea Moro	15		5	Y		11/4/19	16/5/2019	40	ICW	100				21/6/2019	TBC
16	M-F/SMA	Strategic Management	Prof Michael Bourne	15		5	Y		10/4/19	16/6/2019	40	ICW	100				21/6/2019	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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
		Accounting and Control																
17	M-F/MAD	Mergers and Acquisitions	Dr Andrea Moro	15		5	Y		10/04/2019	26/05/2019	40	ICW	100				21/6/2019	TBC
18	M-F/FEC	Applied Financial Econometrics	Dr Yacine Belghitar Dr Peter Yallup	15		5	Y		09/4/19	08/5/2019	40	ICW	100				21/6/2019	TBC
19	M-F/PEQ	Private Equity	Nemanja Radic	15		5	Y		9/4/19	15/5/2019	40	ICW	100				21/6/2019	TBC
20	M-I/FNM	Fund Management	Jane Vessey	15		5	Y		11/04/19	21/06/19	40	EX	100				21/6/2019	TBC
21	M-I/FIS	Fixed Interest Securities	Dr Vineet Agarwal	15		5	Y		17/4/19	01/5/2019	40	EX	100				21/6/2019	TBC
22	M-I/ TATS	Technical Analysis and Trading Systems	Dr Peter Yallup	15		5	Y		9/4/19	8/5/2019	40 40	ICW GCW	50 50				21/6/2019	TBC
23	M-I/IEM	International Investment and Emerging Markets	Prof Sunil Poshakwale	15		5	Y		10/4/19	02/5/2019	40			100 MULTI	IPRES ICW	25 75	21/6/2019	TBC

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRA – Individual Practical; 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
		TERM 4																
24	M-F/THS	Thesis	Dr Andrea Moro	50		80	Y		25/6/2019 <sup>9</sup>	6/9/2019		THESIS	100				6/9/2019	

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

## Finance and Management (Muscat)

Module Number	Module code	Title	Module Leader	Contact hours <sup>12</sup>	Total hours delivered by Visiting Lecturers <sup>13</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	Residential' Start Date	Residential' End Date	Minimum Mark <sup>14</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>15</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>16</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>17</sup>	Assessment Submission and/or exam date <sup>18</sup>	Assessment / Exam Retake date
1	M-F/COF Occ B	Corporate Finance	Dr Yacine Belghitar	20		10	Y		FT/PT 11/11/18	FT/PT 15/11/18	40	EX	100				10/12/18	TBC
2	M-F/SAF Occ B	Statistical Analysis in Finance	Abdul Mohammed	20		10	Y		FT/PT 7/10/18	FT/PT 11/10/18	40 40	GCW EX	40 60				20/12/18 11/12/18	TBC
3	M-F/ACC Occ B	Accounting	Dr Matthias Nnadi	20	6	10	Y		FT/PT 21/10/18	FT/PT 25/10/18	40 40	EX EX	25 75				13/11/18 12/12/18	TBC
4	M-F/ECO Occ B	Economics for Financial Markets	Dr Constantinos Alexiou	20		10	Y		FT 25/11/18	FT 29/11/18	40	EX	100				08/01/19	TBC

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

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

<sup>14</sup> 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  $\geq 50\%$ . This will be at the Board of Examiners discretion.

<sup>15</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>16</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>17</sup> 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.

<sup>18</sup> 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; IPAC – Individual Practical; 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 <sup>12</sup>	Total hours delivered by Visiting Lecturers <sup>13</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	Residential' Start Date	Residential' End Date	Minimum Mark <sup>14</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>15</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>16</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>17</sup>	Assessment Submission and/or exam date <sup>18</sup>	Assessment / Exam Retake date
5	M-F/ORG Occ B	Organisational Management	Emma Parry	20		10	Y		FT/PT 10/02/19	FT/PT 14/02/19	40	ICW	100				18/12/18	TBC
6	M-F-STR Occ B	Strategic Management	Dr Richard Schoenberg	20		10	N		FT/PT 22/04/18	FT/PT 26/04/18	40	EX	100				15/03/19	TBC
7	M-F/ICFM	International Corporate Finance (Muscat)	Prof Sunil Poshakwale	20		10	N		FT/PT 24/02/19	FT/PT 28/02/2019	40 40	GPRAC EX	25 75				25/03/19 21/03/19	TBC
8	M-F/VFM Occ B	Valuation and Financial Modelling	Dr Vineet Agarwal	20		10	Y		FT/PT 27/01/19	FT/PT 31/01/19	40 40	GCW EX	50 50				18/03/2019	TBC
9	M-F/FMRE Occ B	Financial Markets, Regulation and Ethics	Dr Walter Gontarek	20	14 / 6	10	Y		FT/PT 13/01/19	FT/PT 17/01/19	IPRC 70		MULTI 30	GPres GPres	15 15	I	17/01/19 17/01/19 22/01/19	TBC
10	M-F/RMF Occ B	Research Methods in Finance	Dr Vineet Agarwal	20		10	Y		FT 10/03/19	FT 14/03/19	40 40	GPRES ICW	30 70				14/03/19 08/04/19	TBC
		(Electives – choose any 4)																
11	M-F/CRS Occ B	Corporate Restructuring	Dr Yacine Belghitar	15		5	Y		FT/PT 07/04/19	FT/PT 11/04/19	40	ICW	100				21/6/2019	TBC
12	M-F/IFF	Infrastructure Finance	Ian Alexander	15		5	Y		Not running for Muscat		40	EX	100					

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRACT – Individual Practical; 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 <sup>12</sup>	Total hours delivered by Visiting Lecturers <sup>13</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	Residential' Start Date	Residential' End Date	Minimum Mark <sup>14</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>15</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>16</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>17</sup>	Assessment Submission and/or exam date <sup>18</sup>	Assessment / Exam Retake date
13	M-F/ENF Occ B	Entrepreneurial Finance	Dr Andrea Moro	15		5	Y		FT 28/04/19	FT 02/05/19	40	ICW	100				21/6/2019	TBC
14	M-F/SMA Occ B	Strategic Management Accounting and Control	Prof Michael Bourne	15		5	Y		Not running in 2018/19		40	ICW	100					
15	M-F/MAD Occ B	Mergers and Acquisitions	Dr Andrea Moro	15		5	Y		FT 20/05/19	FT 23/05/19	40	ICW	100				21/6/2019	TBC
16	M-F/FEC	Applied Financial Econometrics	Dr Yacine Belghitar Dr Peter Yallup	15		5	Y		Not running for Muscat		40	ICW	100					
17	M-F/PEQ Occ B	Private Equity	Dr Benoit Chevalier	15		5	Y		FT/PT 16/06/19	FT/PT 20/06/19	40	ICW	100				21/6/2019	TBC
18	M-I/FNM	Fund Management	Jane Vessey	15		5	Y		Not running for Muscat		40	EX	100					
19	M-I/FIS	Fixed Interest Securities	Dr Vineet Agarwal	15		5	Y		Not running for Muscat		40	EX	100					
20	M-I/TATS	Technical Analysis and Trading Systems	Dr Peter Yallup	15		5	Y		Not running for Muscat		40 40	ICW GCW	50 50					

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRA – Individual Practical; GPRA – 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 <sup>12</sup>	Total hours delivered by Visiting Lecturers <sup>13</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>14</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>15</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>16</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>17</sup>	Assessment Submission and/or exam date <sup>18</sup>	Assessment / Exam Retake date
21	M-I/IEM	International Investment and Emerging Markets	Prof Sunil Poshakwale	15		5	Y		Not running for Muscat		40			100 MULTI	IPRES ICW	25 75	TBC	
22	M-F/THS Occ B	Thesis	Dr Andrea Moro	50		80	Y		25/06/19	06/09/19		THESIS	100				06/09/19	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRA – Individual Practical; GPRA – 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.

<b><u>Module code</u></b>	<b><u>Module title</u></b>	<b><u>Course that owns the module</u></b>	<b><u>Other course(s)/ programme(s) that use the module</u></b>
M-F/COF	Corporate Finance	Finance and Management	Investment Management
M-F/SAF	Statistical Analysis in Finance	Finance and Management	Investment Management
M-F/ACC	Accounting	Finance and Management	Investment Management
M-F/ECO	Economics for Financial Markets	Finance and Management	Investment Management
M-F/ORG	Organisational Management	Finance and Management	Investment Management
M-F/VFM	Valuation and Financial Modelling	Finance and Management	Investment Management
M-F/FMRE	Financial Markets, Regulation and Ethics	Finance and Management	Investment Management Retail and Digital Banking
M-F/RMF	Research Methods in Finance	Finance and Management	Investment Management
M-F/MAD	Mergers and Acquisitions	Finance and Management	Investment Management
M-F/BCS	Blockchain, Cryptocurrencies, and Smart Contracts	Finance and Management	Investment Management
M-F/FEC	Applied Financial Econometrics	Finance and Management	Investment Management
M-F/BDM	Bigdata Management and Cybersecurity	Finance and Management	Finance and Management
M-F/PEQ	Private Equity	Finance and Management	Investment Management
M-F/CRS	Corporate Restructuring	Finance and Management	Investment Management
M-F/IFF	Infrastructure Finance	Finance and Management	Investment Management
M-F/ENF	Entrepreneurial Finance	Finance and Management	Investment Management
M-F/SMA	Strategic Management Accounting and Control	Finance and Management	Investment Management
M-I/FNM	Fund Management	Investment Management	Finance and Management
M-I/FIS	Fixed Income Securities	Investment Management	Finance and Management
M-I/TATS	Technical Analysis and Trading Systems	Investment Management	Finance and Management
M-I/IEM	International Investment and Emerging Markets	Investment Management	Finance and Management
M-F/THS	Thesis	Finance and Management	Finance and Management

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

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

This approach has been adopted in order to give the opportunity for students to learn in groups and develop their soft skills such as negotiation strategy and effective presentation.

## Assessment and ILO Mapping

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

Award ILOs																					
Module No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8	ILO 9	ILO 10	ILO 11	ILO 12	ILO 13	ILO 14	ILO 15	ILO 16	ILO 17	ILO 18	ILO 19	ILO 20	
	Postgraduate Certificate							Postgraduate Diploma							MSc						
1	✓		✓	✓		✓	✓														
2	✓		✓		✓	✓	✓														
3	✓	✓	✓	✓		✓	✓														
4	✓		✓				✓														
5	✓		✓				✓														
6	✓		✓						✓				✓		✓						
7	✓				✓				✓	✓	✓			✓	✓						
8					✓		✓	✓	✓	✓	✓		✓	✓	✓						
9	✓	✓	✓	✓		✓	✓		✓		✓				✓						
10								✓	✓	✓		✓		✓	✓						
11								✓	✓		✓	✓	✓	✓	✓	✓		✓	✓		
12									✓	✓	✓	✓				✓		✓	✓		
13						✓		✓	✓	✓	✓										
14				✓	✓		✓	✓													
15								✓	✓		✓	✓	✓	✓	✓	✓		✓	✓		
16									✓	✓	✓	✓			✓	✓		✓	✓		
17								✓	✓		✓	✓	✓	✓	✓	✓		✓	✓		
18									✓	✓	✓	✓	✓			✓	✓	✓	✓		
19								✓	✓		✓	✓	✓	✓	✓	✓		✓	✓		
20								✓	✓		✓		✓	✓	✓	✓		✓			
21									✓		✓			✓	✓			✓			
22										✓	✓	✓	✓	✓	✓			✓			
23								✓	✓		✓	✓		✓	✓	✓		✓			
24																	✓			✓	

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

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

## 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?**

Almost all of our graduates for whom we have career data work in financial institutions or consultancies specialising in financial services.

A large number of our students have joined prestigious financial service organisations including investment banks, private equity firms, stock brokers, financial consultancies and commercial banks.

## **COURSE SPECIFICATION**

### **Cranfield University: Course Specifications**

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

**COURSE TITLE:** MSc in Food Chain Systems

**Date of first publication/latest revision:** 05/03/18

#### **1. What is the course?**

##### **Course information**

<b>Course Title</b>	Food Chain Systems
<b>Course code</b>	MSFOSFTC, MSFOSPTC, PDFOSFTC, PDFOSPTC, PCFOSFTC, PCFOSPTC
<b>Academic Year</b>	2018/19
<b>Valid entry routes</b>	MSc, PgDip, PgCert
<b>Additional exit routes</b>	PgDip, PgCert
<b>Mode of delivery</b>	Full-time, Part-time
<b>Location(s)<sup>1</sup> of Study</b>	Cranfield
<b>School(s)</b>	School of Water, Energy and Environment
<b>Theme</b>	Environment & Agrifood
<b>Centre</b>	Cranfield Soil and Agrifood Institute
<b>Course Director</b>	Dr Angel Medina Vaya
<b>Awarding Body</b>	Cranfield University
<b>Is this an AP Contract course?<sup>2</sup></b>	No
<b>Teaching Institution</b>	Cranfield University.
<b>Admissions body</b>	Cranfield University
<b>Entry requirements</b>	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
<b>UK Qualifications Framework Level</b>	QAA FHEQ Level 7 (Masters)

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

<sup>2</sup> AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

<b>Benchmark Statement(s)</b>	N/A
<b>Registration Period(s) available</b>	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
<b>Course Start Month(s)</b>	Full Time: October Part-time: throughout the year (October preferred, other times on case by case basis)

### **Institutions delivering the course**

This course is delivered by the Cranfield Soil and Agrifood Institute where the research interests include agriculture, precision agriculture, soil biology, plant genomics, seed biology, food microbiology (bacteriology and mycology) and postharvest technology.

Our research activities span different disciplines including soil sciences, seed biology, plant genetics, food bacteriology and mycology and postharvest technology. This wide range of research activities and our network of national and international collaborations gives us the opportunity to offer a variety of research projects to our MSc students that suit their individual research interests.

This course belongs to the Food Chain Systems Industrial Advisory Panel which formally meets once a year. Current members of the Industrial Advisory Panel include, among others: McDonald's Restaurants Ltd, Coca Cola Enterprises, Unilever, Cobrey Farms and an independent consultant

Cranfield University also actively seeks sponsorship and support for individual thesis projects from the food and environmental sector employers to provide professional experience and development opportunities for students. Thesis sponsors and supporters include: Coca Cola Enterprises, Selva Organic, McDonald's Restaurants Ltd, GreenWay Foods, Giles Foods, Discovery Foods, and Whitworth's.

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

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

### **Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)**

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

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

Cranfield University offers this course in order to:

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



This programme is intended for the following range of students:

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

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

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

#### **A. Postgraduate Certificate in Food Chain Systems**

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

- ILO 1. Evaluate and compare the utilisation of classical and the most recent technologies in order to improve or maintain food quality at different stages of the food chain (pre- and post-harvest, transport, processing).
- ILO 2. Compare the importance of different food contaminants and analysis techniques to evaluate the utilisation of existing and new methodologies to reduce food contamination in different food chains thus improving food safety.
- ILO 3. Holistically analyse different food chains considering their multiple stages, including the management and business-wide needs, and diversity to identify strengths and weaknesses by synthesising existing knowledge and proposing potential improvements to increase final product quality and safety and increase the potential business success.

#### **B. Postgraduate Diploma in Food Chain Systems**

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

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

#### **C. MSc in Food Chain Systems**

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

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

### **4. How is the course taught?**

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

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

The Group Projects are group-based research programs typically undertaken between February and April. The projects are designed to integrate knowledge, understanding and skills from the taught modules in a real-life situation. Part time students that might have problems when scheduling the group project are offered the possibility to develop a dissertation, which in most situations will be based around a topic relevant to the student's work. The definition of the dissertation topic will be determined in consultation with the Food Chain Systems Course Director. It is expected that the dissertation will be submitted at the beginning of the second year of part time study (if the course is taken over two years). However, the precise date of submission will be agreed with the Course Director.

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

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

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

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

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

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

### **A. Postgraduate Certificate**

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Induction Module	0
Food Diagnostics	10
Food Safety & Quality Management and Certification	20
Postharvest Technology	10
Management for Technology	10

<b>ELECTIVE MODULES:</b>	
Select TWO of the following remaining taught modules:	
Plant Based Food Quality	10
Postharvest Technology	10
Food Chain Resilience	10
Agrifood Business Innovation	10
<b>TOTAL:</b>	<b>60</b>

## B. Postgraduate Diploma

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Induction Module	0
Food Diagnostics	10
Food Safety & Quality Management and Certification	20
Management for Technology	10
Plant Based Food Quality	10
Postharvest Technology	10
Food Chain Resilience	10
Agrifood Business Innovation	10
Group project (Module 11) (Full time or Part Time students)	40
<b>ELECTIVE MODULES:</b>	
Module 12 - Dissertation in place of Group Project (Part time only)	40
<b>TOTAL:</b>	<b>120</b>

## 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
<b>COMPULSORY MODULES:</b>	
Induction Module	0
Food Diagnostics	10
Food Safety & Quality Management and Certification	20
Management for Technology	10
Plant Based Food Quality	10
Postharvest Technology	10
Food Chain Resilience	10
Agrifood Business Innovation	10
Group project (Module 11) (Full time or Part Time students)	40
Individual thesis project (Module 13)	80
<b>ELECTIVE MODULES:</b>	

Module 12 - Dissertation in place of Group Project (Part time only)	40
<b>TOTAL:</b>	<b>200</b>

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  $\geq 50\%$ ;
- An average mark of  $\geq 50\%$  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);<sup>3 4</sup>
- **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  $\geq 50\%$  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  $\geq 40$  credits, which are not part of the taught assessment average), the pass mark of  $\geq 50\%$  (where they exist);
- **For the thesis**, a mark of  $\geq 50\%$  in order to receive a pass (where it exists).

## 6. How is the course structured?

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

<sup>3</sup> 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).

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

The course is also offered on a part-time basis and such students are expected to complete the course within 2 to 3 years. Part-time students are not restricted to starting in October. Instead they are offered individual guidance on the best sequence of study based on their prior knowledge and availability to attend.

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

## 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
1	I-AGF-INWK	Induction module	A Medina Vaya	33		0	Y		01/10/18	05/10/18	N/A	AO	N/A				N/A	
2	I-AGF-PBFQ	Plant Based Food Quality	A Thompson	30		10	N		08/10/18	12/10/18	40			100	ICW IPRES	70 30	ICW - FT - 20/10/18 ICW - PT - 03/11/18 IPRES - FT/PT – 12/10/18	July 19

<sup>5</sup> Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

<sup>6</sup> Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

<sup>7</sup> 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  $\geq 50\%$ . This will be at the Board of Examiners discretion.

<sup>8</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>9</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>10</sup> 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.

<sup>11</sup> 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; IPRACT – Individual Practical; 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
3	I-FCS-A1005	Food Diagnostics	M Carmen Alamar	25		10	N		22/10/18	26/10/18	40	ICW	100				ICW -FT - 03/11/18 PT - 17/11/18	July 19
4	I-FCS-FSQM C	Food Safety and Quality Management and Certification	A Medina-Vaya	81		20	N		05/11/18	16/11/18	40	ICW	100				ICW - FT - 01/12/18 PT - 17/12/18	July 19
5	I-FFS-FCR	Food Chain Resilience	A Ghadge	25		10	Y		03/12/18	07/12/18	40	ICW	100				ICW 15/12/18	July 19
6	I-FCS-A1007	Postharvest Technology	S Kourmpetli	30		10	N		17/12/18	21/12/18	40			100	ICW	30 70	ICW - FT - 12/01/19 PT - 02/02/19	July 19
7	G-MTI	Management for Technology	R Adams	50		10	Y		14/01/19	18/01/19	40	EX	50 50				FT/PT - Exam week 4 (18-22 Feb)	July 19 September 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

Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment		Submission dates		
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
																	19)	
8	I-FCS-ABI	Agrifood Business Innovation	A Medina-Vaya	40		10	Y		28/01/19	01/02/19	40			100	ICW	30 70	ICW - FT-19/02/19 PT - 23/02/19	July 19
9	I-AGF-GRP P	Group Project	A Medina Vaya	16		40	Y		18/02/19	03/05/19	50	GPROJ ICW	80 20				GPROJ - 29/04/19 ICW - 04/05/19	
10	I-AGF-DISS	Dissertation in place of group project for part time students	A Medina Vaya	10		40	Y		01/10/18	27/09/19	50	IPROJ IPRES	80 20				27/09/19	
11	I-AGF-THESIS	Individual Thesis Project	Individually assigned	20		80	N		06/05/19	06/09/19	50	THESIS OR	90 10				02/09/19	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPAC – Individual Practical; GPAC – 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.

<u>Module code</u>	<u>Module title</u>	<u>Course that owns the module</u>	<u>Other course(s)/ programme(s) that use the module</u>
I-FFS-FCR	Food Chain Resilience	Future Food Sustainability	Food Chain Systems
G-MTI	Management for Technology	School of Management	<ul style="list-style-type: none"> <li>• Advanced Mechanical Engineering</li> <li>• REMS EngD</li> <li>• Food Chain Systems</li> <li>• Offshore Engineering</li> <li>• Renewable Energy Engineering</li> <li>• Energy Systems and Thermal Processes</li> <li>• Process Systems Engineering</li> <li>• Geothermal Engineering</li> <li>• Advanced Chemical Engineering</li> </ul>

## 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

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

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

### A. Postgraduate Certificate in Food Chain Systems

Award ILOs Module No.	ILO 1	ILO 2	ILO 3

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

### B. Postgraduate Diploma in Food Chain Systems

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

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

### C. MSc in Food Chain Systems

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

Award ILOs Module No.	ILO 5	ILO 6
11	THESI S/OR	THESI S/OR

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

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

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

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

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

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

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

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

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

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

New Partnership arrangements are considered in two stages:

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

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

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

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

On completion, graduates have a broader network of global contacts, increased opportunities for individual specialism in their chosen career.

Some of the employers over the last three years include:

- Coca Cola Enterprises
- Giles Foods
- G's

## **COURSE SPECIFICATION**

### **Cranfield University: Course Specifications**

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

**COURSE TITLE:** MSc in Forensic Programme

**Date of first publication/latest revision:** August 2018

### **1. What is the course?**

#### **Course information**

<b>Course Title</b>	Forensic Programme
<b>Course code</b>	<b>MSc, PgDip Forensic Archaeology and Anthropology</b> (MSFAAFTR– PDFAAFTR – MSFAAPTR – PDFAAPTR) <b>MSc, PgDip Forensic Ballistics</b> (MSFBLFTR – PDFBLFTR– MSFBLPTR – PDFBLPTR) <b>MSc, PgDip Forensic Engineering and Science</b> (MSFESFTR– PDFESFTR – MSFESPTR – PDFESPTR) <b>MSc, PgDip Forensic Explosives and Explosion Investigations</b> (MSFEIFTR, PDFEIFTR, MSFEIPTR, PDFEIPTR) <b>MSc, PgDip, PgCert Forensic Investigation</b> (MSFOIFTR – PDFOIFTR – MSFOIPTR – PDFOIPTR – PCFOIFTR – PCFOIPTR) <b>MSc, PgDip, PgCert Digital Forensics</b> (MSDFOFTR , PDDFOFTR, PCDFOFTR – MSDFOPTR, PDDFOPTR, PCDFOPTR) SPFPPPTR
<b>Academic Year</b>	2018/2019
<b>Valid entry routes</b>	MSc, PgDip, PgCert
<b>Exit routes</b>	PgDip, PgCert, MSC
<b>Mode of delivery</b>	Full-time, Part-time
<b>Location(s)<sup>1</sup> of Study</b>	Shrivenham
<b>School(s)</b>	Cranfield Defence and Security
<b>Theme</b>	Defence and Security
<b>Centre</b>	Cranfield Forensic Institute
<b>Programme Director</b> <b>Course Directors</b>	Professor David Lane Professor Peter Zioupos (Forensic Investigation) Dr Jon Painter (Forensic Explosives)

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

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

### **Institutions delivering the course**

This course is delivered by Cranfield Forensic Institute within Cranfield Defence and Security, where the research interests include security technology, forensic archaeology and anthropology, ballistics, explosives, forensic computing, information technology security and legal issues, forensic engineering, forensic biomechanics and osteomics.

Teaching and assessment for some parts of the course is provided by other Schools of the University, including the School of Aerospace, Transport and Manufacturing; Cranfield Defence and Security, however, remains fully responsible for the quality of delivery of the course.

### **Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)**

This course is accredited formally by the Chartered Society of Forensic Sciences until April 2022.

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

Cranfield University offers this course in order to:

- provide students with an understanding of how the physical sciences and other specific disciplines can be used to help resolve issues in relation to civil and criminal law
- help equip students with the necessary understanding of science and other specific disciplines, courtroom skills and research methods in order to prepare them to practise as professional forensic scientists, forensic engineers or digital forensic professionals.

Postgraduate Diploma (PgDip) and Postgraduate Certificate (PgCert) exit routes are provided for

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<sup>2</sup> AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

students who wish to access only parts of the course provided.

This programme is intended for the following range of students:

- graduates with relevant first degrees
- other graduates working in relevant professional fields of study, including forensic science, information technology, forensic engineering and law
- practitioners in forensic computing, information technology or forensic science.

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

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

#### **A. Postgraduate Certificate**

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

- ILO 1. develop a critical awareness of current practice in forensic science
- ILO 2. demonstrate critical assessment and originality of thought through the examination of a wide range of different types of evidence using at first hand many of the analytical techniques within the armoury of the modern forensic scientist, engineer or digital forensic professional
- ILO 3. critically assess data through the application of appropriate statistical tests and reasoning
- ILO 4. demonstrate a critical awareness of the importance of traceability of evidence
- ILO 5. communicate effectively through the written word and orally by means of expert witness reports and the presentation of evidence in court
- ILO 6. demonstrate a wide range of transferable skills through the regular use of computer based literature searches, critical use of the Internet and the use of desktop publishing techniques to construct reports.

#### **B. Postgraduate Diploma**

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

- ILO 7. acquire and assimilate knowledge from a wide range of adjacent disciplines in archaeology, anthropology, engineering, computer science and the physical sciences that impact on forensics.

#### **C. MSc**

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

- ILO 8. understand and employ the scientific principles behind current analytical techniques and procedures to critically evaluate new ones and solve problems encountered
- ILO 9. independently plan and execute a detailed research project and present results at meetings
- ILO 10. write a research thesis that includes:
- a critical review of established forensic practice in a particular field
  - a critical evaluation of current research and methodologies in the area, categorising good and bad practice, and defending their opinions
  - a clear explanation of experimental/analytical procedures and the presentation of results by appropriate means
  - self-critical discussion of experimental/ analytical results with conclusions that place the research in the context of the professional practice of the forensic sciences.

#### **4. How is the course taught?**

Our education philosophy is led by the basic principles of:

- research led teaching – through a course team that are active researchers or practitioners
- hands-on experience – experience based learning through students spending time in the laboratory
- access to a dedicated computer student lab where they will be able to undertake digital forensic examinations and experimentation
- access to various digital forensic tools including the leading examination software access to external experts who are considered to be at the top of their field and are currently practising in digital forensics
- learning through assessment methods - we view assessment as part of the learning process, with a variety of assessment methods extending the curriculum and transferable skills
- an immersion culture – as part of the Cranfield experience we aim to fully immerse our students in forensics, not just through lectures, tutorials and workshops, but also through social interaction with teaching staff.

The main instrument of teaching and learning in the taught phase modules remains the traditional lecture, incorporating the effective use of visual aids and supported by high quality written material where appropriate. Tutorial sessions centring on a particular subject area or involving more wide-ranging discussions are also an important feature of the course. However, there is a growing move to reduce the amount of teacher-centred learning and allow students to take the initiative in the learning process. Thus many modules include a requirement for each student to make an oral presentation to the rest of the class on a piece of practical work or a specific subject in the literature that is then assessed by the staff present. This is a challenging task but students recognise its importance in the context of a future career in forensic science and find it stimulating. When there is no requirement for an oral presentation then a piece of laboratory practical work will be written up as a report for the police or the court, rather than as a traditional student laboratory report. This ensures that students are continually encouraged to think about report writing and are given frequent opportunities to improve their techniques as they progress



through the course. The 'Courtroom Skills' module provides a focus for the discussion of verbal and writing skills but students are given guidance on reports and presentations at a very early stage in the course during Introductory Studies.

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

- Good staff student relations. Staff are enthusiastic and helpful and the students respond accordingly. The Course Director or Programme Director is usually available to address any immediate issues of concern that a student or students may have in connection with the course.
- All students are provided with a personal tutor who is available to support the student and advise on academic issues and provide pastoral care.
- Named subject matter experts who oversee each theme and who can specifically advise on matters relating to choice of elective modules.

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

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

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

### A. **Postgraduate Diploma in Forensic Archaeology and Anthropology**

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Modules 2-5	50
Modules 13-16	40
<b>ELECTIVE MODULES:</b>	
Module 1	0
3 modules selected from any of the following: 7, 8, 10, 17, 19-22, 26, 27, 28, 39	30
<b>TOTAL:</b>	<b>120</b>

### B. **MSc in Forensic Archaeology and Anthropology**

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

Description	Credits
<b>COMPULSORY MODULES:</b>	

Modules 2-5	50
Modules 13-16	40
Research project (25)	80
<b>ELECTIVE MODULES:</b>	
Module 1	0
3 modules selected from any of the following: 7, 8, 10, 17, 19-22, 26, 27, 28, 39	30
<b>TOTAL:</b>	<b>200</b>

### C. Postgraduate Diploma in Forensic Ballistics

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Modules 2-5	50
Modules 9-12	40
<b>ELECTIVE MODULES:</b>	
Module 1	0
3 modules selected from any of the following: 6, 7, 8, 13, 15, 19-22, 26, 27, 28, 37, 38, 39	30
<b>TOTAL:</b>	<b>120</b>

### D. MSc in Forensic Ballistics

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Modules 2-5	50
Modules 9-12	40
Research project (25)	80
<b>ELECTIVE MODULES:</b>	
Module 1	0
3 modules selected from any of the following: 6, 7, 8, 13, 15, 19-22, 26, 27, 28, 37, 38, 39	30
<b>TOTAL:</b>	<b>200</b>

### E. Postgraduate Diploma in Forensic Engineering Science

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

Description	Credits
<b>COMPULSORY MODULES:</b>	

Modules 2-5	50
Modules 7, 9, 37, 38	40
<b>ELECTIVE MODULES:</b>	
Module 1	0
3 modules selected from any of the following: 6, 8, 10, 11, 12, 13, 15, 19-22, 24, 26, 27, 28, 39	30
<b>TOTAL:</b>	<b>120</b>

#### H. MSc in Forensic Engineering Science

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Modules 2-5	50
Modules 7, 9, 37, 38	40
Research project (25)	80
<b>ELECTIVE MODULES:</b>	
Module 1	0
3 modules selected from any of the following: 6, 8, 10, 11, 12, 13, 15, 19-22, 24, 26, 27, 28, 39	30
<b>TOTAL:</b>	<b>200</b>

#### F. PgDip in Forensic Explosives and Explosion Investigation

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Modules 2-5	50
Modules 6, 7, 26, 27	40
<b>ELECTIVE MODULES:</b>	
Module 1	0
3 modules selected from any of the following: 8, 9, 10, 11, 13, 15, 19-22, 28, 37, 38, 39	30
<b>TOTAL:</b>	<b>120</b>

#### G. MSc in Forensic Explosives and Explosion Investigation

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

Description	Credits
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<b>COMPULSORY MODULES:</b>	
Modules 2-5	50
Modules 6, 7, 26, 27	40
Research project (25)	80
<b>ELECTIVE MODULES:</b>	
Module 1	0
3 modules selected from any of the following: 8, 9, 10, 11, 13, 15, 19-22, 28, 37, 38, 39	30
<b>TOTAL:</b>	<b>200</b>

#### H. Postgraduate Certificate in Forensic Investigation

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
30 credits selected from Modules 2-5	30
<b>ELECTIVE MODULES:</b>	
Module 1	0
3 modules: To be agreed with the Course Director from the remaining modules 2-5, or 6-17, 19-22, 26-29, 37-40	30
<b>TOTAL:</b>	<b>60</b>

#### I. Postgraduate Diploma in Forensic Investigation

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Modules 2-5	50
<b>ELECTIVE MODULES:</b>	
Module 1	0
7 modules selected from any of the following: 6-17, 19-22, 26-29, 37 - 40	70
<b>TOTAL:</b>	<b>120</b>

#### J. MSc in Forensic Investigation

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

Description	Credits
<b>COMPULSORY MODULES:</b>	

Modules 2-5	50
Research Project (25)	80
<b>ELECTIVE MODULES:</b>	
Module 1	0
7 modules selected from any of the following: 6-17, 19-22, 26-29 37-40	70
<b>TOTAL:</b>	<b>200</b>

#### K. Postgraduate Certificate in Digital Forensics

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Module 29	20
<b>ELECTIVE MODULES:</b>	
Module 1	0
4 modules chosen from Modules 27, 28 & 30 to 35	40
<b>TOTAL:</b>	<b>60</b>

#### L. Postgraduate Diploma in Digital Forensics

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Module 29	20
Modules 2, 3, 5 & 30	40
<b>ELECTIVE MODULES:</b>	
Module 1	0
Up to 60 credits selected from any of the following modules: 28, 31- 35 To include no more than 10 credits from modules: 8, 21 and 27	60 (10 credits per module)
<b>TOTAL:</b>	<b>120</b>

#### M. MSc in Digital Forensics

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

Description	Credits
<b>COMPULSORY MODULES:</b>	

Module 29	20
Modules 2, 3, 5 & 30	40
Research Project (36)	80
<b>ELECTIVE MODULES:</b>	
Module 1	0
Up to 60 credits selected from any of the following modules: 28, 31- 35 (To include no more than 10 credits from modules) 8, 21 and 27	60
<b>TOTAL:</b>	<b>200</b>

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  $\geq 50\%$ ;
- An average mark of  $\geq 50\%$  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);<sup>3 4</sup>
- **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  $\geq 50\%$  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);

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<sup>3</sup> 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).

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

- it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to  $\geq 40$  credits, which are not part of the taught assessment average), the pass mark of  $\geq 50\%$  (where they exist);
- **For the thesis**, a mark of  $\geq 50\%$  in order to receive a pass (where it exists).

## 6. How is the course structured?

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

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

With the exception of Analytical Techniques and Forensic Computing Foundations which have a two week residential most modules are taught over one week with sufficient time allocated to complete the coursework assignment(s). For Digital Forensic modules where examinations form part of the assessment pattern, the examinations will be completed within the residential week; the coursework will be completed after the residential module. The examination for Reasoning for Forensic Science and coursework for Investigation and Evidence Collection are completed after the residential element of the module. The coursework for Courtroom skills is submitted before the module with a practical assessment completed during the residential week

Each option within the course is based around a specific set of option-specific, compulsory modules (a “theme”), with a complementary series of associated role-specific modules. Students select modules across the whole programme according to their individual requirements and entry qualifications.

Students are asked to consider their option and theme prior to completing all of the common compulsory modules. This choice will be made in close consultation with a designated personal tutor.

Students would normally commence their individual research project only on successful completion of the taught component of the course. It is expected that the individual research project will normally fall within the scope of the dominant theme established in the taught phase.

## Course modules

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

Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
1	R-FP-IS	Introductory Studies	Peter Masters	70	0	0	N	03/09/18	01/10/18	05/10/18	N/A	AO					N/A	N/A
2	R-FP-IEC	Investigation and Evidence Collection	Hannah Moore	34	0	10	Y	08/10/18	08/10/18	12/10/18	50			100	GPRES ICW	25 75	09/11/18ALL 09/11/18FT 23/11/18PT	TBC

<sup>5</sup> Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

<sup>6</sup> Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

<sup>7</sup> 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  $\geq 50\%$ . This will be at the Board of Examiners discretion.

<sup>8</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>9</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>10</sup> 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.

<sup>11</sup> Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

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



Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
3	R-FP-RFS	Reasoning for Forensic Science	Peter Zioupos	25	0	10	N	15/10/18	15/10/18	19/10/18	50	EX	100				18/12/18	16/04/19
4	R-FP-AT	Analytical Techniques	David Lane & Fiona Brock	40	0	20	Y	12/11/18	12/11/18	23/11/18	50	ICW	100				21/12/18FT 16/01/19PT	TBC
5	R-FP-CS	Courtroom Skills	Peter Zioupos	25	0	10	N	01/10/18	29/04/19	03/05/19	50 50			100	OR ICW	60 40	02&03/05/19 15/03/19	Next available opportunity
6	R-FP-FIIED	Forensic Investigation of Explosives and Explosive Devices	Nathalie Mai	30	0	10	Y	25/02/19	25/02/19	01/03/19	40	ICW	100				29/07/19FT 12/04/19PT	TBC
7	R-FP-FEI	Fires, Explosions and their Investigation	Stephen Johnson	28	0	10	Y	03/06/19	03/06/19	07/06/19	40	ICW	100				05/07/19FT 19/07/19PT	TBC
8	R-FP-TE	Trace Evidence	David Lane	24	0	10	N	20/05/19	20/05/19	24/05/19	40	ICW	100				21/06/19FT 05/07/19PT	TBC

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Module Number	Module code	Title	Module Leader	Contact hours <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
9	R-FP-MEP	Materials Engineering and Processing	Jon Painter	32	0	10	N	29/10/18	29/10/18	02/11/18	40	ICW	100				30/11/18FT 14/12/18PT	TBC
10	R-FP-IFIFB	Introduction to Firearms Investigations and Forensic Ballistics	James Shackel	32	0	10	N	03/12/18	03/12/18	07/12/18	40	ICW	100				15/01/19FT 29/01/19PT	TBC
11	R-FP-FI	Firearms Investigations	James Shackel	32	0	10	N	28/01/19	28/01/19	01/02/19	40	ICW	100				01/03/19FT 15/03/19PT	TBC
12	R-FP-FBI	Forensic Ballistics Investigations	James Shackel	32	0	10	N	25/03/19	25/03/19	29/03/19	40	ICW	100				30/04/19FT 15/05/19PT	TBC
13	R-FP-FARBR	Forensic Archaeology: Recovering Buried Remains	Roland Wessling	28	0	10	N	29/10/18	29/10/18	02/11/18	40	ICW	100				30/11/18FT 14/12/18PT	TBC
14	R-FP-FAMGE	Forensic Archaeology:	Roland Wessling	56	0	10	N	18/03/19	18/03/19	24/03/19	40 40			100	IPRAC ICW	50 50	24/03/19 23/04/19FT	TBC

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		Mass Grave Excavation															08/05/19PT	
15	R-FP-FFAO	Fundamentals of Forensic Anthropology: Osteology	Nick Marquez Grant	33	0	10	N	07/01/19	07/01/19	11/01/19	40	ICW	100				08/02/19FT 22/02/19PT	TBC
16	R-FP-FFAI	Further Forensic Anthropology: Identification	Nick Marquez Grant	32	0	10	N	11/02/19	11/02/19	15/02/19	40	EX	100				15/04/19	21/05/19
17	R-FP-PAE	Practical Archaeological Excavation	Peter Masters & Dennis Braekmans	50	0	10	N	Running in June 2019			40			100	IPRAC ICW	40 60	June 2019 June 2019	TBC
19	R-FP-MFI	Mass Fatality Incidents	Sophie Becket	28	0	10	Y	13/05/19	13/05/19	17/05/19	40	ICW	100				17/06/19FT 01/07/19PT	TBC
20	R-FP-EFS	Environmental Forensic Science	Hannah Moore	28	0	10	N	26/11/18	26/11/18	30/11/18	40 40			100	IPRES ICW	50 50	08/01/19ALL 08/01/19FT 22/01/19PT	TBC

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

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21	R-FP-FF	Fakes and Forgeries	Dennis Breakmans & Andrew Shortland	28	0	10	N	14/01/19	14/01/19	17/01/19	40	ICW	100				14/02/19FT 28/02/19PT	TBC
22	R-FP-RIFS	Radiographic Investigations in Forensic Science	Roland Wessling & Keith Rogers	25	0	10	N	04/02/19	04/02/19	08/02/19	40 40			100	ICW1 ICW2	40 60	08/03/19FT 22/03/19PT 08/03/19FT 22/03/19PT	TBC
24	N-HFS-AAI	Aircraft Accident Investigation and Response	Peter McCarthy	30	0	10	Y	08/04/19	08/04/19	12/04/19	40	ICW	100				13/05/19FT 10/06/19PT <b>N.B this hand in is at 1600 for all students</b>	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 ; MULTI – Multi-part assessment

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												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessments <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
25	R-FP-DISS	Research Project	Keith Rogers	50	0	80	N	15/04/19	15/04/19	30/08/19	50			100	EXEC THESIS ORAL	20 60 20	30/08/19	N/A
26	R-FP-HF	Hazardous Forensics	Matt Healy	28	0	10	N	01/04/19	01/04/19	05/04/19	40 40			100	GPRAC 1 GPRAC 2 ICW1&2 ICW1&2	10 10 40 40	05/04/19 05/04/19 03/05/19FT 17/05/19PT	TBC
27	R-FP-FEAI	Forensic Exploitation & Intelligence	Stephen Johnson	28	0	10	N	21/01/19	21/01/19	25/01/19	40 40			100	ICW1 ICW2	50 50	22/02/19FT 08/03/19PT	TBC
28	F-FCO-FP	Digital Crime and Investigation	Sarah Morris	28	0	10	N	18/02/19	18/02/19	22/02/19	40	ICW	100				25/03/19FT 08/04/19PT	TBC
29	R-FCO-FCF	Forensic Computing Foundations	Sarah Morris	60	0	20	N	13/05/19	13/05/19	24/05/19	40 40 40	EX1 EX2 ICW	15 25 60				23/05/19 24/05/19 24/06/19FT 08/07/19PT	Next available opportunity

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

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								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
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30	R-FCO-FI1	Internet Forensics	Sarah Morris	35	0	10	N	Course not Running 2018/2019			40	ICW	100					TBC
31	R-FCO-FN1	Network Forensics	Sarah Morris	35	0	10	N	Course not Running 2018/2019			40	ICW	100					TBC
32	R-FCO-SPFC1	Programming for Digital Forensics	Sarah Morris	35	0	10	N	Course not Running 2018/2019			40	ICW	100					TBC
33	R-FCO-MOX	Mac OS X Forensics	Sarah Morris	32	0	10	N	Course not Running 2018/2019			40 40	EX ICW	40 60					TBC
34	R-FCO-AFC1	Advanced Forensic Computing	Sarah Morris	35	0	10	N	Course not Running 2018/2019			40	ICW	100					TBC
35	R-FCO-FCUL1	Digital Forensics Using Open Source Tools	Sarah Morris	35	0	10	N	Course not Running 2018/2019			40 40	EX ICW	40 60					TBC
36	R-FCO-DISS	Project	Sarah Morris	16	0	80	N	03/10/18	03/10/18	30/08/19	50	THESIS	100				30/08/19PT only	N/A

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

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								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessments <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
37	R-FP-AFIA	Approach to Failure Investigation and Analysis	Dennis Braekmans	30	0	10	N	11/03/19	11/03/19	15/03/19	40	ICW	100				12/04/19FT 01/05/19PT	TBC
38	R-FP-FAC	Failure Mechanisms of Materials	Jon Painter	30	0	10	Y	04/02/19	04/02/19	08/02/19	40	ICW	100				08/03/19FT 22/03/19PT	TBC
39	R-FP-CEDC	Counter-Improvised Explosive Devices Capability	Stephen Johnson	28	0	10	N	18/02/19	18/03/19	22/03/19	50	IPRES	100				25/04/19	TBC
40	R-SISD-IAS	Cyber Security & Information Assurance	Darren Lawrence	30	0	10	Y	18/02/19 (PT)	11/03/19	15/03/19	40	GCW	25				15/03/19 FT/PT	AY19/20
								04/03/19 (FT)			40	ICW	75				25/03/19 FT 08/04/19 PT	

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

**Module Type for Forensic Award Themes (C – Compulsory, E – Elective, RS – Role Specific)**

Module	MSc Theme	Forensic Archaeology and Anthropology	Forensic Ballistics	Forensic Engineering and Science	Forensic Investigation	Forensic Explosives and Explosion Investigation	Digital Forensics (no 18/19 intake)		Marketed as short course	Joint with another MSc
1	IS	E	E	E	E	E	E			
2	IEC	C	C	C	C	C	C		YES	
3	RFS	C	C	C	C	C	C		YES	
4	AT*	C	C	C	C	C			YES	
5	CS	C	C	C	C	C	C		NO	
6	FIEED		E	E	E	RS			YES	
7	FEI	E	E	RS	E	RS			YES	
8	TE	E	E	E	E	E	E		YES	
9	MEP		RS	RS	E	E			YES	
10	IFIFB	E	RS	E	E	E			YES	
11	FI**		RS	E	E	E			YES	
12	FBI**		RS	E	E				YES	
13	FARBR	RS	E	E	E	E			YES	
14	FAMGE	RS			E				YES	
15	FFAO	RS	E	E	E	E			YES	
16	FFAI**	RS			E				YES	
17	PAE	E			E				YES	
19	MFI	E	E	E	E	E			YES	
20	EFS	E	E	E	E	E			YES	

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



Module	MSc Theme	Forensic Archaeology and Anthropology	Forensic Ballistics	Forensic Engineering and Science	Forensic Investigation	Forensic Explosives and Explosion Investigation	Digital Forensic		Marketed as short course	Joint with another MSc
21	FAF	E	E	E	E	E	E		YES	
22	RIFS	E	E	E	E	E			YES	
24	AAIR			E						YES
25	DISS - FP	C	C	C	C	C				
26	HF	E	E	E	E	RS			YES	
27	FEAI	E	E	E	E	RS	E		YES	
28	DCI	E	E	E	E	E	E			
29	FCF				E		RS			
30	FI1						RS			
31	FN1						E			
32	PDF						E			
33	MOX						E			
34	AFC1						E			
35	FCUOST						E			
36	DISS - FC						C			
37	AFIA**		E	RS	E	E			YES	
38	FAC**		E	RS	E	E			YES	
39	CEDC	E	E	E	E	E			YES	
40	IAS				E					YES

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

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

<u>Module code</u>	<u>Module title</u>	<u>Course that owns the module</u>	<u>Other course(s)/ programme(s) that use the module</u>
N-HFS-AAI	Aircraft Accident Investigation and Response	MSc Safety & Human Factors in Aviation	MSc Safety & Accident Investigation MSc Military Aerospace and Airworthiness
R-SASD-IAS	Cyber Security & Information Assurance	MSC Information Capability Management	

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

The assessment of candidates is based upon a combination of examinations, coursework assignments and, for masters course students, the research based dissertation:

- For the PgCert, a balance of assignments and examinations is designed to assess underlying principles and applications within the forensic environment and an ability to acquire and use information in that context.
- In the PgDip, the emphasis develops into a greater depth of analysis of role specific issues. Focus is on best practice and awareness of current research in that particular field. Students are expected to take on a professional role and assessments involve critical evaluation and professional judgement through a balance of report writing (including expert witness statements, analytical reports and critical reviews) oral examinations (individual and group presentations) and written examinations.

To complete the course to the award of a Masters level qualification, students must progress through PgCert and PgDip modules and assessment to the final element of the programme, the research based dissertation. Students must pass this final element of the programme with a minimum mark of 50%. The practical nature of the course requires that this should normally be based on an experimental investigation and should be appropriate for the scope of the dominant theme established in the taught phase.

A variety of different types of coursework are used to assess different aspects of the student's knowledge and ability. Conventional essay work is used to test research skills and analytical ability, and is often based on a critical review of the literature. A wide range of data types and sources are used. While journals, conference papers and specialist textbooks are most frequently used, students are expected to use other sources such as government publications, newspapers, television and internet sites when appropriate. Consequently, students have to demonstrate an awareness of the reliability of the source and the possibility of conflicting interests. Professional skills are developed through writing analytical reports on case studies and practical work, with a particular emphasis on clear but concise presentation. Students can expect assessed coursework to be returned to them no longer than 20 working days following the deadline for handing in, according to university regulations.

Throughout the course both individual and group presentations and briefings are used to assess communication skills appropriate for a range of target audiences. The first presentation is made in groups, as this is particularly valuable for instilling confidence and assessing an individual's ability

to work within a team. However, each member is expected to clearly demonstrate his or her individual contribution and partake in the presentation.

All forensic computing modules require a coursework assignment based on an essay, a practical forensic examination or experimentation. The Forensic Computing Foundations module requires two such assignments. Most forensic computing modules also have a written examination either theory, practical or a combination of the two.

### Assessment and ILO Mapping

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

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

#### A. Postgraduate Certificate

<b>Award ILOs Module No.</b>	<b>ILO 1.</b>	<b>ILO 2.</b>	<b>ILO 3.</b>	<b>ILO 4.</b>	<b>ILO 5.</b>	<b>ILO 6.</b>
1						
2	ICW GPRES	ICW GPRES		ICW GPRES		
3		EX	EX			
4	ICW	ICW	ICW			
5	ICW	ICW			ICW	ICW
6	ICW	ICW		ICW	ICW	
7		ICW		ICW		
8	ICW	ICW	ICW	ICW		
9		ICW				ICW
10	ICW	ICW			ICW	ICW
11	ICW	ICW		ICW	ICW	ICW
12	ICW	ICW	ICW			ICW
13	ICW	ICW				
14	ICW					ICW
15	ICW					
16	Ex					EX
17	ICW					PRAC
19	ICW			ICW		ICW
20	ICW IPRES		ICW IPRES	ICW IPRES		
21	ICW		ICW		ICW	
22	ICW1	ICW1		IPRES	ICW1	ICW1

					IPRES	
24	ICW					ICW
26		ICW1			ICW1	
27			ICW1		ICW2	ICW2
28	ICW			ICW	ICW	
29	EX ICW	EX ICW		EX ICW	ICW	ICW
30	ICW	ICW				ICW
31	ICW	ICW	ICW			ICW
32	ICW	ICW				ICW
33	EX ICW	EX ICW	ICW	ICW		ICW
34	ICW	ICW	ICW	ICW	ICW	ICW
35	EX ICW	EX ICW	ICW	ICW		ICW
37	ICW		ICW			ICW
38			ICW			ICW
39	IPRES	IPRES	IPRES	IPRES	IPRES	IPRES
40	ICW GCW	ICW GCW				ICW GCW

## B. Postgraduate Diploma

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

<b>Award ILOs Module No.</b>	<b>ILO 1.</b>	<b>ILO 2.</b>	<b>ILO 3.</b>	<b>ILO 4.</b>	<b>ILO 5.</b>	<b>ILO 6.</b>	<b>ILO 7.</b>
1							
2	ICW GPRES	ICW GPRES		ICW GPRES			
3		EX	EX				
4	ICW	ICW	ICW				
5	ICW	ICW			ICW	ICW	
6	ICW	ICW		ICW	ICW		ICW
7		ICW		ICW			ICW
8	ICW	ICW	ICW	ICW			
9		ICW				ICW	
10	ICW	ICW			ICW	ICW	
11	ICW	ICW		ICW	ICW	ICW	
12	ICW	ICW	ICW			ICW	ICW
13	ICW	ICW					ICW

14	ICW					ICW	PRAC
15	ICE						ICW
16	EX						EX
17	ICW					PRAC	
19	ICW			ICW		ICW	ICW
20	ICW IPRES		ICW IPRES	ICW IPRES			
21	ICW		ICW		ICW		
22	ICW1	ICW1		IPRES	ICW1 IPRES	ICW1	IPRES
24	ICW					ICW	ICW
26		ICW1			ICW1		ICW2
27			ICW1		ICW2	ICW2	ICW1
28	ICW			ICW	ICW		
29	EX ICW	EX ICW		EX ICW	ICW	ICW	
30	ICW	ICW				ICW	
31	ICW	ICW	ICW			ICW	
32	ICW	ICW				ICW	
33	EX ICW	EX ICW	ICW	ICW		ICW	
34	ICW	ICW	ICW	ICW	ICW	ICW	
35	EX ICW	EX ICW	ICW	ICW		ICW	
37	ICW		ICW			ICW	
38			ICW			ICW	
39	IPRES	IPRES	IPRES	IPRES	IPRES	IPRES	IPRES
40	ICW GCW	ICW GCW				ICW GCW	ICW GCW

### C. MSc

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

Award ILOs Module No.	ILO 1.	ILO 2.	ILO 10.
25	ORAL	EXEC	THESIS
36	IPROJ	IPROJ	IPROJ

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

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

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

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

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

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

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

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

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

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

New Partnership arrangements are considered in two stages:

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

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

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

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

The programme offers a highly effective springboard into many career opportunities. These include employment routes to Government and non-Governmental bodies, police departments and independent forensic consultants working for insurance companies. It is also a necessary introduction that leads into conducting research at PhD level in the subject.

The Digital Forensics MSc could be an important stepping-stone to an academic career in Digital Forensics.

Specific course features that enable a high probability of employment include the growing field of digital forensics, the niche areas of ballistics and explosives, the science base to archaeology and anthropology, and managerial roles within government laboratories.

## **COURSE SPECIFICATION**



### **Cranfield University: Course Specifications**

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

**COURSE TITLE:** MSc Future Food Sustainability

**Date of first publication/latest revision:** 06/03/18

#### **1. What is the course?**

##### **Course information**

<b>Course Title</b>	Future Food Sustainability
<b>Course code</b>	MSFFSFTC, MSFFSPTC, PDFFSFTC, PDFFSPTC, PCFFSFTC, PCFFSPTC
<b>Academic Year</b>	2018/19
<b>Valid entry routes</b>	MSc, PgDip, PgCert
<b>Additional exit routes</b>	PgDip, PgCert
<b>Mode of delivery</b>	Full-time, Part-time
<b>Location(s)<sup>1</sup> of Study</b>	Cranfield
<b>School(s)</b>	School of Water, Energy and Environment
<b>Theme</b>	Environment & Agrifood
<b>Centre</b>	Cranfield Soil and Agrifood Institute
<b>Course Director</b>	Dr Sofia Kourmpetli
<b>Awarding Body</b>	Cranfield University
<b>Is this an AP Contract course?<sup>2</sup></b>	No
<b>Teaching Institution</b>	Cranfield University
<b>Admissions body</b>	Cranfield University
<b>Entry requirements</b>	<p>Candidates must normally possess, or be expected to achieve, a 1st or 2nd class UK Honours degree in a relevant science or social science-based discipline, or the international equivalent of these UK qualifications. Other relevant qualifications together with industrial experience may be considered.</p> <p>International students will need to provide evidence that they have achieved a satisfactory test result in an English qualification. The</p>

<sup>1</sup> If any part of this course is delivered at another site, please note which one(s) here

<sup>2</sup> AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract



	minimum standard expected is as follows: IELTS - 6.5, TOEFL – 92, Pearson PTE Academic – 65, Cambridge English Scale – 180, Cambridge English: Advanced – C, Cambridge English: Proficiency - C
<b>UK Qualifications Framework Level</b>	QAA FHEQ Level 7 (Masters)
<b>Benchmark Statement(s)</b>	N/A
<b>Registration Period(s) available</b>	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
<b>Course Start Month(s)</b>	Full-time: October Part-time: normally an October start

### **Institutions delivering the course**

This course is mainly delivered by the Cranfield Soil and Agrifood Institute in collaboration with other Cranfield University schools and institutes: The Cranfield Institute for Resilient Futures, Cranfield Water Science Institute and the Cranfield School of Management where the research interests include: soil health, food production, postharvest technology, food mycology, plant genetics, strategic thinking, food chain logistics, water usage and management.

Cranfield University interacts with several institutions with the aim of improving the employability of its students. This course will benefit from the feedback obtained through the Environment and Agrifood Industrial Advisory Panel composed by companies throughout the entire food chain.

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

### **Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)**

The course has been accredited by the Institution of Agricultural Engineers (IAgrE) until 2021.

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

- To provide students with a critical awareness of the challenges, risks and opportunities of providing a sustainable supply of sufficient food to the world's population both now and in the future
- To develop graduates with the capacity to undertake successful technical research projects using appropriate methods of critical analysis
- To develop critical, creative and independent learners who can participate freely in the wide area of future food sustainability

This programme is intended for the following range of students:

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

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

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

### **A. Postgraduate Certificate in Future Food Sustainability**

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

- ILO 1. Evaluate the main principles and issues of providing a sustainable supply of sufficient food in the future from a European and in some instances a global perspective
- ILO 2. Critically appraise the scientific interventions such as crop development, water usage and soil management, in terms of their ability to mitigate against future food sustainability issues
- ILO 3. Develop systematic and analytical skills in informatics based on the use of scientific data derived from crop development, and water and soil usage
- ILO 4. Integrate technological and social science information and show how they can be utilised to predict future impacts

### **B. Postgraduate Diploma in Future Food Sustainability**

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

- ILO 5. Assess how sustainability options based on technological developments can be utilised for financial and economic decision making
- ILO 6. Apply key aspects of supply chain management which are critical to the resilience of the global food supply network, and show how they can be used in integrated decision making
- ILO 7. Integrate knowledge, understanding and skills from the taught modules in a real-life situation to address problems faced by clients; creating new problem diagnoses, designs, or system insights; and communicating findings in a professional manner in written, oral and visual forms.

### **C. MSc in Future Food Sustainability**

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

- ILO 8. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought.
- ILO 9. To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences.

#### 4. How is the course taught?

The MSc course is taught in three sections: taught modules, a group project, and an individual research project.

- The taught programme, typically delivered between October and February, comprises a structured sequence of modules, each containing a series of lectures and other classroom-based teaching, supplemented by practical work. Eight taught modules are assessed by assignments. Each module is taught over one week, followed by a week largely free of structured teaching to allow time for more independent learning and reflection, and completion of the module assignment.
- The Group Projects are group-based research programs typically undertaken between February and April. The projects are designed to integrate knowledge, understanding and skills from the taught modules in a real-life situation.
- The thesis project, typically delivered between May and September, further develops research and project management skills that: provide the ability to think and work in an original way; contribute to knowledge; overcome genuine problems; and communicate through a Thesis and oral exam. Each student is allocated a supervisor, who will guide and assess the student work. Guidance sessions are provided as to what is required from the Thesis and oral presentation.

Within induction week, students will be introduced to personal development planning and asked to reflect on their transferable skills and to take ownership of their personal development during the course. In addition, students carry out a reflective review exercise during their Group Project where they reflect on PDP objectives set in the Group Project

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

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

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

##### A. **Postgraduate Certificate**

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Induction Module	0
Principles of Sustainability	10
Water and Sustainable Agrifood Systems	10
Soil Systems	10
Agricultural Informatics	10
Plant-based Technologies	10
Strategic Foresight	10
<b>ELECTIVE MODULES:</b>	

<b>TOTAL:</b>	<b>60</b>
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## B. Postgraduate Diploma

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

Description	Credits
<b>COMPULSORY MODULES:</b>	
Induction Module	0
Principles of Sustainability	10
Water and Sustainable Agrifood Systems	10
Soil Systems	10
Financial and Economic Appraisal	10
Agricultural Informatics	10
Plant-based Technologies	10
Food Chain Resilience	10
Strategic Foresight	10
Group Project (Full Time Students)	40
<b>ELECTIVE MODULES:</b>	
Part Time Students: Group Project	40
OR Dissertation	40
<b>TOTAL:</b>	<b>120</b>

## 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
<b>COMPULSORY MODULES:</b>	
Induction Module	0
Principles of Sustainability	10
Water and Sustainable Agrifood Systems	10
Soil Systems	10
Financial and Economic Appraisal	10
Agricultural Informatics	10
Plant-based Technologies	10
Food Chain Resilience	10
Strategic Foresight	10
Group Project (Full Time Students)	40
Thesis	80
<b>ELECTIVE MODULES:</b>	
Part Time Students: Group Project	40
OR Dissertation	40
<b>TOTAL:</b>	<b>200</b>

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  $\geq 50\%$ ;
- An average mark of  $\geq 50\%$  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);<sup>3 4</sup>
- **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  $\geq 50\%$  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  $\geq 40$  credits, which are not part of the taught assessment average), the pass mark of  $\geq 50\%$  (where they exist);
- **For the thesis**, a mark of  $\geq 50\%$  in order to receive a pass (where it exists).

## 6. How is the course structured?

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

The course is also offered on a part-time basis and such students are expected to complete the course within 2 to 3 years. Part-time students are not restricted to starting in October. Instead they are offered individual guidance on the best sequence of study based on their prior knowledge and availability to attend

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<sup>3</sup> 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).

<sup>4</sup> 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 <sup>5</sup>	Total hours delivered by Visiting Lecturers <sup>6</sup>	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module <sup>8</sup> (%) of Independent assessments	Weighting within module of multi-part assessments <sup>9</sup> (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment <sup>10</sup>	Assessment Submission and/or exam date <sup>11</sup>	Assessment / Exam Retake date
1	I-AGF-INWK	Induction Module	A Medina Vaya	33		0	Y		01/10/18	05/10/18	N/A	AO	N/A				N/A	
2	I-EMB-A1122	Principles of Sustainability	Paul Burgess	26		10	Y		08/10/18	12/10/18	40	ICW	100				FT 20/10/18 PT 03/11/18	July 19

<sup>5</sup> Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

<sup>6</sup> Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

<sup>7</sup> 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  $\geq 50\%$ . This will be at the Board of Examiners discretion.

<sup>8</sup> For **independent assessments** please record type and weighting of each separate piece of assessment individually.

<sup>9</sup> For **multi-part assessments** please record the overall weighting of module which should be 100%.

<sup>10</sup> 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.

<sup>11</sup> 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; IPRACT – Individual Practical; 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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3	I-FFS-WSS	Water and Sustainable Agrifood Systems	T Hess	30		10	N		22/10/18	26/10/18	40	ICW	100				FT 03/11/18 PT 17/11/18	July 19
4	I-LAM-A1138	Soil Systems	J Hannam	34		10	Y		05/11/18	09/11/18	40	ICW	100				FT - 24/11/18PP T - 08/12/18	July 19
5	I-EMB-FEA	Financial and Economic Appraisal	P Burgess	25		10	Y		19/11/18	23/11/18	40	ICW	100				FT 01/12/18 PT 15/12/18	July 19
6	I-FFS-AI	Agricultural Informatics	D Simms	40		10	N		17/12/18	21/12/18	40	ICW	100				FT 05/01/19 PT 19/01/19	July 19
7	I-FFS-PBT	Plant-based Technologies	A Thompson	20		10	N		14/01/19	18/01/19	40	ICW	100				FT 26/01/19 PT 09/02/19	July 19

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

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								Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark <sup>7</sup> - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
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8	I-FFS-FCR	Food Chain Resilience	A Ghadge	25		10	Y		03/12/18	07/12/18	40			100	GCW (F/T) ICW (P/T) GPR ES	30  70	GPRES - 07/12/18 GCW - 06/12/2018 ICW 15/12/2018	July 19
9	I-EMB-A1005	Strategic Foresight	K Garnett	30		10	Y		04/02/19	08/02/19	40	ICW	100				FT 16/02/19 PT 02/03/19	July 19
10	I-AGF-GRPP	Group Project	Individually assigned	16		40	N		18/02/19	03/05/19	50	GPROJ ICW	80 20				2904/19 04/05/19	
11	I-AGF-DISS	Dissertation in place of group project for part time students	A Medina Vaya	10		40	N		01/10/18	27/09/19	50	IPROJ IPRES	80 20				28/09/18	
12	I-AGF-THESIS	Individual Thesis Project	Individually assigned	20		80	N		06/05/19	06/09/19	50	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.

<u>Module code</u>	<u>Module title</u>	<u>Course that owns the module</u>	<u>Other course(s)/ programme(s) that use the module</u>
I-EMB-A1005	Strategic Foresight	Environmental Management for Business	Future Food Sustainability
I-LAM-A1138	Soil Systems	Land Reclamation and Restoration	Future Food Sustainability
I-EMB-FEA	Financial and Economic Appraisal	Environmental Management for Business	Future Food Sustainability
I-FFS-FCR	Food Chain Resilience	Future Food Sustainability	Food Chain Systems
I-EMB-A1122	Principles of Sustainability	Environmental Management for Business	Future Food Sustainability Land Reclamation and Restoration REMS EngD

## 7. How are the ILOs assessed?

The following assessment types are utilised:

The taught modules are assessed by in-module assessment (including a mix of summative and formative coursework, which focuses on application of principles studied and underpinning knowledge). In addition, the Group Project for full-time students is assessed by two written reports and an oral presentation. The performance of each student in the group to work individually and as part of a team is assessed by means of one of the written reports, which is a reflective review. The dissertation for part-time students is based on a review of available information including academic literature, presentation of ideas and analysis and the development of conclusions.

### Assessment and ILO Mapping

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

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

#### A. Postgraduate Certificate

<b>Award ILOs</b> <b>Module No.</b>	ILO1	ILO2	ILO3	ILO4
2	ICW			ICW
3	ICW	ICW		

Award ILOs Module No.	ILO1	ILO2	ILO3	ILO4
4	ICW	ICW		
6			ICW	
7	ICW	ICW		
9	ICW			ICW

## B. Postgraduate Diploma

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

Award ILOs Module No.	ILO5	ILO6	ILO7
5	ICW		
8		GCW / ICW GPRES	
10			GPROJ ICW
11			IPROJ IPRES

## C. MSc

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

Award ILOs Module No.	ILO9	ILO10
12	THESIS /OR	THESI S/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.

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

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

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

This course is part of the Agriculture and Food teaching Programme within CSAFI and, as such, is teamed with the MSc course in Food Chain Systems. The Future Food Sustainability course will therefore make use of relevant links with industry that have previously been developed. This is anticipated to include employment opportunities for suitable graduates. Some of the employers over the last three years include:

- Coca Cola Enterprises
- Giles Foods
- Whitworth's Ltd
- Discovery Foods

On completion, graduates also have a broad network of global contacts, and increased opportunities for individual specialism in their chosen careers by making use of Cranfield Alumnus Society.