

Faculty: **Science, Technology and Creative Arts**

Title of Programme: Modular Masters in Aerospace, Automotive, Manufacturing and
Mechanical

Programme Code: EIMASTAD

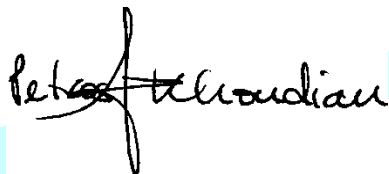
Programme Specification

Start Date: September 2011

Date of Approval: 20th September 2011

Associate Dean (Academic Quality): Petros Khoudian

Signature



Petros Khoudian

Programme Specification

MSc Aerospace Engineering

MSc Automotive Engineering

MSc Mechanical Engineering

MSc Manufacturing Management

MSc Operations and Supply Chain Management

This programme specification (PS) is designed for prospective students, enrolled students, academic staff and potential employers. It provides a concise summary of the main features of the programme and the intended learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the teaching, learning and assessment methods, learning outcomes and content for each module can be found in Definitive Module Documents (DMDs) and Module Guides.

Section 1

Awarding Institution/Body	University of Hertfordshire
Teaching Institution	University of Hertfordshire
University/partner campuses	Not Applicable
Programme accredited by	Not Applicable
Final Award	MSc
All Final Award titles	Aerospace Engineering Automotive Engineering Mechanical Engineering Manufacturing Management Operations and Supply Chain Management
FHEQ level of award	7

A. Programme Rationale

This programme consist of a number of “specialist” Masters awards with an expectation that students will have studied a related engineering discipline to a Bachelor’s level or equivalent, as opposed to a “conversion” masters philosophy aimed at students from a non-engineering background. The MSc awards are normally studied over three semesters with the final semester being a 60 credit point individual project. The MSc has two starting points. This has been adopted to meet the demand from international students whose previous studies were conducted with a different academic year to the normal September to September year operated in the UK. The consequence of this is that the modules that make up the MSc curriculum need to be independent of each other as the two intake groups of students will not necessarily take modules in the same order. Students entering in semester B will therefore complete their studies over an 18 month period rather than 12 months. It is also possible for a student to study these awards on a part-time basis over a three year period.

The successful postgraduates of the programme will acquire the knowledge and understanding, intellectual, practical and transferable skills necessary for the analysis and synthesis of problems in engineering and manufacturing through a combination of experimental, simulation, research methods and case studies. They can expect to gain work in a range of disciplines within a variety of industries from specialist technical roles to positions of management responsibility.

On the MSc Aerospace Engineering, the development of skills and advancement of knowledge focus on:

- dynamic structural and aeroelastic analysis of aerospace vehicles, flight dynamics, stability and control and the implications for the design and construction of aerospace vehicles;
- the construction of CFD models and to assess implications of results, the limitations of present techniques and the potential future direction of developments in the CFD and aerodynamics field;
- appreciation of the need for process, product development and quality and reliability issues relevant to the introduction of products in a cost effective and timely manner;
- critical review of the present knowledge base, its applicability, usage and relevance to enhance product and enterprise performance.

On the MSc Automotive Engineering, the development of skills and advancement of knowledge focus on:

- the selection of materials, process and techniques for the structural analysis and the design and construction of automotive components such as body and chassis, in relation to vibration and vehicle dynamics;
- understanding of alternative power train and fuel technologies, their impact on vehicle performance and environment;
- the construction of CAE models and to assess implications of the results, the limitations of present techniques and the potential future direction of developments in the CAE field;
- appreciation of the need for process and product development relevant to the introduction of products in a cost effective and timely manner;
- critical review of the present knowledge base, its applicability, usage and relevance to enhance product and enterprise performance.

On the MSc Mechanical Engineering, the development of skills and advancement of knowledge focus on:

- the selection of materials, process and techniques for the structural analysis, design and construction of engineered components;
- the understanding of the control and dynamics theories used in the design of systems and more specifically their application in a wide variety of engineered systems and subsystems;
- the construction of CAE models and evaluation of results, the limitations of present techniques and the potential future direction of developments in the CAE field;
- appreciation of the need for process, product development and quality and reliability issues relevant to the introduction of products in a cost effective and timely manner;
- critical review of the present knowledge base, its applicability, usage and relevance to enhance product and enterprise performance.

On the MSc Manufacturing Management, the development of skills and advancement of knowledge focus on:

- the broad areas of business, operations management, information systems, product development and quality systems;
- design orientated tasks, including analysis and synthesis, to develop relevant and applicable procedures and processes to resolve technical and ultimately business problems;
- critical review of the present knowledge base, its applicability, usage and relevance to enhance product and enterprise performance.

On the MSc Operations and Supply Chain Management, the development of skills and advancement of knowledge focus on:

- the broad areas of business, operations management, operations research, procurement and supply chain management, financial control, manufacturing information systems, manufacturing strategy; legal aspects of supply chain; and human resources management;
- case studies, including analysis and synthesis, contribution to profitability, understanding of purchasing, procurement and logistics;
- critical review of strategic value, procurement and supply chain management.

B. Educational Aims of the Programme

The programme has been devised in accordance with the University's general educational aims of programmes of study as set out in UPR TL01.

Additionally this programme aims to:

- provide a quality education at postgraduate level in the disciplines of aerospace, automotive, mechanical, manufacturing management/technology and operations and supply chain management;
- provide an educational opportunity and experience to graduates and/or those with appropriate previous experience which enhances their prospects of professional employment with industry;
- provide a variety of awards of study through which the postgraduate may demonstrate competence, knowledge, skills and understanding, in and of, selected disciplines in the field of engineering, management and technology;
- provide the students with the knowledge and understanding to equip them for a career in technical and engineering management;
- provide and equip the students with theory and the practice of process and technology management, system design and implementation.

C. Intended Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills and other attributes in the following areas. The programme outcomes are referenced to the Framework for Higher Education Qualifications in England, Wales and Northern Ireland (2008) and relate to the typical student. Additionally, the SEEC Credit Level Descriptors for Further and Higher Education 2003 have been used as a guiding framework for curriculum design.

Knowledge and Understanding of:	Teaching/learning methods & strategies	Assessment
<p>Aerospace Engineering, Automotive Engineering and Mechanical Engineering</p> <p>A1. The advanced CAE and simulation methods employed by aerospace/automotive/mechanical engineers.</p> <p>A2. The fundamental sciences appropriate to aerospace/automotive/mechanical engineering.</p> <p>A3. Appropriate research methods employed in analysis of technical and commercial problems.</p> <p>A4. The product/process definition and systems design process.</p>	<p>Acquisition of knowledge and understanding is through a combination of lectures, seminars, group discussions and assignments.</p> <p>Throughout, the learner is encouraged to undertake independent study both to supplement and consolidate what is being taught/learnt and to broaden their individual knowledge and understanding of the subject.</p>	<p>Knowledge and understanding are assessed through a series of case studies, assignments, project reports and unseen examinations.</p>
<p>Manufacturing Management and Operations and Supply Chain Management</p> <p>A5. The techniques relevant to the analysis of business strategy and planning.</p>		

<p>A6. The product definition and systems design process.</p> <p>A7. Relevant techniques for commercial and professional engineering practice.</p> <p>A8. Operations management techniques and processes in manufacturing and service sectors.</p> <p>A9. Resource management planning and systems implications.</p> <p>A10. The analytical techniques employed in management and process control.</p>		
<p>Intellectual skills - able to:</p>	<p>Teaching/learning methods & strategies</p>	<p>Assessment</p>
<p>All awards</p> <p>B1. Analyse and solve engineering problems using appropriate techniques.</p> <p>B2. Design/model/analyse relevant engineering systems/subsystems.</p> <p>B3. Critically review and select appropriate research methods to solve engineering and commercial problems.</p> <p>B4. Evaluate external influences on the design process.</p> <p>Additionally:</p> <p>Manufacturing Management and Operations and Supply Chain Management</p> <p>B5. Identify the influence of resource related issues on operations and business.</p> <p>B6. Design appropriate management systems and processes.</p>	<p>Intellectual skills are developed throughout the programme by the methods and strategies outlined in section A, above.</p> <p>Analysis, problem solving and modelling skills are further developed through case studies, class discussion, in-course exercises, assignments and exams.</p> <p>Throughout, the learner is encouraged to further develop intellectual skills by guided and independent study.</p>	<p>Intellectual skills B1-B6 are assessed through case studies, experiential work, tutorials, assignment and examinations. These are supported by work centred on analysis and synthesis, problem solving, in technical and managerial contexts.</p>
<p>Practical skills - able to:</p>	<p>Teaching/learning methods & strategies</p>	<p>Assessment</p>
<p>All awards</p> <p>C1. Apply appropriate experimental, analytical and modelling techniques to a range of aerospace / automotive / mechanical engineering and business problems/applications and draw conclusions.</p>	<p>Practical skills are developed throughout the programme through a series of case studies, experimental and simulation exercises, project reports and viva.</p> <p>Skills C1 – C4, C6 and C7 are developed through the programme of study and associated written reports and submissions.</p>	<p>Practical skills C1-C7 are formerly assessed through assignment work on case studies and the individual project.</p>

<p>C5. Plan and manage project, taking into account commercial, industrial and resource constraints.</p> <p>Additionally:</p> <p>Aerospace Engineering, Automotive Engineering and Mechanical Engineering</p> <p>C2. Use advanced computer-aided engineering tools. C3. Prepare technical documentation. C4. Evaluate the design of appropriate systems, components or processes.</p> <p>Additionally:</p> <p>Manufacturing Management and Operations and Supply Chain Management</p> <p>C6. Appropriate evaluation of the resource constraint implications on management decision making. C7. Plan the effective implementation of appropriate management systems and processes.</p>	<p>C5 is developed throughout the programme of the study, with one-to-one supervision during the individual project.</p>	
<p>Transferable skills - able to:</p>	<p>Teaching/learning methods & strategies</p>	<p>Assessment</p>
<p>All awards</p> <p>D1. Communicate information effectively, orally and/or in writing. D2. Manage time and resources effectively. D3. Work effectively individually and/or within a team. D4. Solve problems in a logical and coherent manner. D6. Learn effectively and independently, in preparation for lifelong learning.</p> <p>Additionally:</p> <p>Aerospace Engineering, Automotive Engineering and Mechanical Engineering</p> <p>D5. Manipulate, sort and present data.</p>	<p>Transferable skills are developed throughout the programme by using group discussions and report writing and require students to manage their own time for achieving targets.</p> <p>Skill D1 is developed through coursework reports, oral presentations, research methods and the project report.</p> <p>Skill D2 is developed through meeting deadlines for scheduled assignments and the individual project.</p> <p>Skills D3, D4 and D5 are developed throughout most modules; through lectures, group work, assessments and the individual project.</p>	<p>Transferable skills D1-D6 are assessed through assignment work and the project.</p>

Skill D6 is encouraged and developed by the nature of the programme of study and the acquisition of transferable skills.

D. Programme Structures, Features, Levels, Modules and Credits

The programme is offered in full-time and part-time modes.

Full-time students may enter the programme for a Semester A start in September when it runs over one calendar year or in January for a semester B start when it runs over 18 months, both in full-time mode. Identical modules will be studied on both September and January intakes. Students on the September and January intakes complete their projects in Semester C or B respectively.

In a part-time mode, the programme is normally offered in 3 years with identical modules studied with the full-time students.

Accreditation of prior learning (APEL/APCL) is available for this programme. Students wishing to claim APL must document their relevant prior learning in detail and must provide full evidence for their prior achievement of the learning outcomes of this programme.

The Programme Learning Outcomes detailed in section 16 are developed and assessed through the constituent modules. Table 2 (at the end of this document) identifies where each learning outcome is developed and assessed.

Programme Structure

The programme structure and progression information below (Table 1a and 1b) is provided for the award. Any interim awards are identified in Table 1b. The Programme Learning Outcomes detailed above are developed and assessed through the constituent modules. Table 2 (in section 2) identifies where each learning outcome is assessed.

Table 1a Outline Programme Structure

Mode of study Full-time/Part-time

A typical study pattern for a 3 year part-time student would be 60 credit points of taught modules in the first year, a further 60 credit points of taught modules in the second year and the project in the final year. The order of the modules is agreed in consultation with the Programme or Deputy Programme tutor with a maximum of 75 credit points within any one academic year.

Entry point A or B

Note: Semester B entry students study the same modules as semester A entry students, except the MSc individual Project is studied in Semester B of the second year rather than semester C.

The following notations should be read in conjunction with tables below:

AM = Aerospace Engineering
AUM = Automotive Engineering
MECM = Mechanical Engineering
MMGM = Manufacturing Management
OSCM = Operations and Supply Chain Management

c = compulsory module
o = optional module

Module Title	Module Code	Award					Credit Pts.	% exam	% ICA	Sem.
		AM	AUM	MECM	MMGM	OSCM				
Aeroelasticity	7AAD0039	c					15	60	40	A
CFD Techniques	7ENT1007	c	c	c			15	60	40	A
Automotive Materials & Manufacture	7AAD0057		c				15	60	40	A
Dynamics and Performance of Mechanical Systems	7AAD0068			c			15	60	40	A
Financial Control	7AAD0060				c	c	15	60	40	A
Manufacturing Information Systems	7AAD0059				c	c	15	60	40	A
Control of Mechanical Systems	7AAD0021	c		c			15	60	40	A
Operations Management	7AAD0065	c		c	c	c	15	60	40	A
Integrated Product Engineering	7AAD0058		c		c		15	60	40	A
Automotive Electrical Systems	7AAD0056		c				15	60	40	A
Human Resource Management	7AAD0062					c	15	60	40	A
Operations Research	7AAD0049	c	c	c	c	c	15	60	40	B
Quality, Reliability & Maintenance	7AAD0055			c	c		15	60	40	B
Legal Aspects of Supply Chain (see Note 2)	7LAW0155					c	15	-	100	A, B
CFD Analysis for Aerospace Applications	7ENT1006	c					15	60	40	B
Flight Mechanics	7AAD0038	c					15	60	40	B
Advanced Engines & Power Systems (see Note 1)	7AAD0061		c				15	60	40	A, B
Automotive Dynamics & Safety	7AAD0054		c				15	60	40	B
FEA and Applications	7ENT1026	c	c	c			15	60	40	B
Advanced Thermodynamics and Thermal Systems	7AAD0034			c			15	60	40	B
Procurement & Supply Chain Management	7AAD0050				c	c	15	60	40	B
Manufacturing Strategy	7AAD0064				c	c	15	60	40	B
MSc Individual Project (MSc Projects)	7ENT1001	c	c	c	c	c	60	0	100	C, B

MSc Transitional Arrangements:

Note 1: 2010/11 Semester B intake students to the MSc in Automotive Engineering will take 7AAD0061 Advanced Engines and Power Systems in semester A 2011/12 instead of semester B.

Note 2: 2010/11 Semester B intake students to the MSc in Operations and Supply Chain Management will take 7LAW0155 Legal Aspects of Supply Chain during semester A of 2011/12 instead of semester B.

To progress to the project stage, the candidates are expected to have successfully completed a minimum of 90 credits.

The award of a Masters Degree requires 180 credit points passed at level 7, including the MSc Individual Project.

Table 1b Final and interim awards available

The programme provides the following final and interim awards:

Award	Minimum requirements	Available at end of (normally):
Postgraduate Certificate	60 credit points.	1-2 Semesters
Postgraduate Diploma	120 credit points.	2, 3 Semesters
Masters	180 credit points.	3 Semesters

Masters and Diploma awards can be made "with Distinction" or "with Commendation" where criteria as described in UPR AS14 and the students' handbook are met.

E. Support for students and their learning

Students are supported by:

- an induction week at the beginning of each new academic session;
- an extensive Learning Resources Centre, incorporating a library and computer centre;
- guided student-centred learning through the use of StudyNet;
- a student handbook that is specific to the programme;
- a Programme Tutor and Deputy Programme Tutors;
- student representatives on programme committees;
- Personal Tutors to provide academic and pastoral support;
- a project supervisor;
- Computer and technical laboratories facilities and technical support staff;
- a Mathematics Drop-in Centre;
- Graduate Futures that provide careers advice and workshops to help students enhance their employability skills;
- a substantial Student Centre that provides advice on issues such as finance, University regulations, legal matters etc;
- an Accommodation Office;
- an International Students Centre who organise an Overseas Student Orientation induction programme;
- printing, photocopying, laminating and document binding facilities;
- Nightline – a confidential student listening and information service in the evening when other services are not available;
- a confidential counselling services;
- a Disabled Student Tutor;
- an Equal Opportunities Officer;
- the Students' Union.

F. Entry requirements

The normal entry requirements for the programme are:

- i. typically a minimum of 2:ii honours degree in Aerospace, Automotive, Mechanical, or Manufacturing, (with a relevant analytical content) based discipline; **or**
- ii. any other contiguous discipline the subject content of which does not overlap with that of the programme to any substantial extent; **or**
- iii. a qualification from any other recognised International academic institution which is of comparable academic standard to those identified above; **or**
- iv. exceptionally, a number of applicants with other relevant professional qualifications who have the necessary academic achievements and experience will be considered under APCL; **and**
- v. a minimum IELTS of 6.0 or equivalent for overseas students prior to the commencement of their MSc. Students without IELTS of 6.0 or equivalent, depending on the Country of Origin, would normally be expected to complete a suitable programme of study prior to the commencement of their MSc programme, such as Pre-Sessional English Classes, Foundation Certificate in English for Academic Studies, International Pre-Masters Programme (IPM), or any other suitable programme deemed appropriate by the University.

Prospective students may be required to attend an interview. In certain cases, a student may be advised or required to undertake preliminary studies or bridging course before starting the course.

The programme is subject to the University's Principles, Policies, Regulations and Procedures for the Admission of Students to Undergraduate and Taught Postgraduate Programmes and will take account of University policy and guidelines for assessing accredited prior certificated learning (APCL) and accredited prior experiential learning (APEL).

Section 2

Programme management

JACS code(s)	H3, H4, H7
Modes of study	F/T and P/T
Intakes	A and B
Relevant QAA subject benchmarking group	N/A
Date of validation/last periodic review	December 2010
Date of production/ last revision of PS	September 2011
Relevant intake	level 7 entering September 2011
Faculty	Science, Technology and Creative Arts
Administrative School(s)/Departments	School of Engineering and Technology

Course (i.e. pathway) details

Course (i.e. Pathway Point) Titles	Course (i.e. Pathway Point) Codes
MSc Aerospace Engineering (sem. A intake)	AM1
MSc Aerospace Engineering (sem. B intake)	AMB1
MSc Aerospace Engineering (part-time)	AMP1, AMP2, AMP3
MSc Automotive Engineering (sem. A intake)	AUM1
MSc Automotive Engineering (sem. B intake)	AUMB1
MSc Automotive Engineering (part-time)	AUMP1, AUMP2, AUMP3
MSc Mechanical Engineering (sem. A intake)	MECM1
MSc Mechanical Engineering (sem. B intake)	MECMB1
MSc Mechanical Engineering (part-time)	MECMP1, MECMP2, MECMP3
MSc Manufacturing Management (sem. A intake)	MMGM1
MSc Manufacturing Management (sem. B intake)	MMGMB1
MSc Manufacturing Management (part-time)	MMGMP1, MMGMP2, MMGMP3
MSc Ops and Supply Chain Mgt. (sem. A intake)	OCSM1
MSc Ops and Supply Chain Mgt. (sem. B intake)	OCSMB1
MSc Ops and Supply Chain Mgt. (part-time)	OCSMP1, OCSMP2, OCSMP3

The programme is managed by:

- a Deputy Head of School who has overall responsibility for quality assurance in the School;
- an Associate Head of School who has overall responsibility for Learning and Teaching in the School;
- an Associate Head of School who has overall responsibility for resources in the School;
- a Programme Tutor who is responsible for chairing the programme committee and advising students on the programme as a whole;
- a Deputy Programme Tutor who is responsible for the day to day management;
- an Admissions Tutor, with specific responsibility for open days and selection;
- a designated Administrator to deal with day to day administration associated with the programme;
- a programme committee that includes the above plus student representation;
- module leaders who are responsible for individual modules.

Programme-specific assessment regulations

The programme is compliant with the University's generic assessment regulations (Structure and Assessment Regulations for Academic Programmes, UPR AS14) with the exception of those listed below, which have been specifically approved by the University:

- Candidates are expected to have successfully completed a minimum of 90 credits of study prior to commencement of their individual project - for further details see section D.

Further points of clarification and interpretation relevant to this specific programme are given below:

- the programme operates a Faculty-wide policy for the treatment of extenuating circumstances relevant to assessments;
- the programme includes individual and group working, as a consequence specific regulations governing cheating and plagiarism are applied in-line with the University's Regulations.

Other sources of information

- Definitive Module Documents
- Module Guides
- Student Handbook
- Programme Specification website:
(StudyNet → Staff → Department Lists → Academic Quality Office → Programme Management → Programme Specifications)
- University of Hertfordshire Course website:
<http://www.herts.ac.uk/courses/>
- QAA Benchmark Statement website:
<http://www.qaa.ac.uk/academicinfrastructure/benchmark/default.asp>
- The Framework for Higher Education Qualifications in England, Wales and Northern Ireland, 2008:
<http://www.qaa.ac.uk/academicinfrastructure/FHEQ/EWNI08/default.asp>
- SEEC Credit Level Descriptors for Further and Higher Education 2003:
<http://www.seec-office.org.uk/creditlevel descriptors2003.pdf>
- External Quality Review report website:
http://www.qaa.ac.uk/revreps/inst_reports.asp?instID=H-0060
- UNISTATS website:
<http://www.unistats.com/>
- University of Hertfordshire Academic Quality Office website:
(StudyNet → Staff → Department Lists → Academic Quality Office)
- Structure & Assessment Regulations - Undergraduate & Taught Postgraduate Programmes, UPR AS14:
<http://herts.ac.uk/secreg/upr/AS14.htm>
- Learning and Teaching Policy and General Educational Aims, UPR TL01:
<http://herts.ac.uk/secreg/upr/TL01.htm>
- Admissions - Undergraduate & Taught Postgraduate Students, UPR SA03:
<http://herts.ac.uk/secreg/upr/SA03.htm>
- Academic Quality, UPR AS17:
<http://herts.ac.uk/secreg/upr/AS17.htm>
- Index of UPRs for students:
http://www.herts.ac.uk/secreg/upr/upr_azlist_student_info.htm
- A-Z of the University of Hertfordshire – downloadable pdf file from Student Support StudyNet website

Other information relevant to the programme

None.

University policies relevant to the Programme

The University undertakes to use all reasonable endeavours to deliver, assess and administer this programme in accordance with this Programme Specification. At the same time it is recognised that it is in the nature of academic developments that changes, for example to the structure, curriculum and assessment of a programme may be necessary in order to ensure that the programme remains up to date, in response to issues raised as a result of on-going monitoring and evaluation and/or in order to conform to new regulatory requirements imposed by this institution, by professional or statutory bodies, or by national or governmental bodies.

The programme operates within the guidelines and policies relating to equal opportunities and environmental issues which may be agreed from time to time by the Board of Governors and/or the Academic Board of the University.

Where the programme is offered in collaboration with another institution these policies and guidelines will normally be those of the partner institution.

The programme operates in accordance with the University's Regulations Governing Studies Involving the Use of Human Subjects (UPR RE01) agreed from time to time by the Academic Board of the University. However, where the programme is offered in collaboration with another institution (for example through a franchise arrangement for all or part of the programme) then specific approval must be obtained from the University for the operation of the programme within ethical guidelines prepared by the partner institution. The partner institution will be responsible for all insurance liability in connection with the observance of ethical guidelines.



Signed
Chair of Faculty Academic Quality Enhancement Committee

Date 20th September 2011

If you would like this information in an alternative format please contact:
Mrs Anne Passmore, Senior Administrator (Academic Quality), Faculty of
Science, Technology and Creative Arts

Telephone: 01707 284102

Email: a.j.passmore@herts.ac.uk

Table 2: Development of Programme Learning Outcomes in the Constituent Modules

This map identifies where the programme learning outcomes are assessed in the constituent modules. It provides (i) an aid to academic staff in understanding how individual modules contribute to the programme aims (ii) a checklist for quality control purposes and (iii) a means to help students monitor their own learning, personal and professional development as the programme progresses.

MSc Aerospace Engineering

		Programme Learning Outcomes (as identified in section 1 and below)																			
		Knowledge & Understanding				Intellectual Skills				Practical Skills					Transferable Skills						
Module Title	Module Code	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5	D6	
Level 7	Aeroelasticity	7AAD0039	X	X		X	X	X		X	X		X		X			X			
	Flight Mechanics	7AAD0038	X	X		X	X	X		X	X		X		X			X			
	CFD Techniques	7ENT1007	X	X			X	X		X	X	X	X		X			X	X		
	CFD Analysis for Aerospace Applications	7ENT1006	X	X		X	X	X		X	X	X	X		X			X	X		
	MSc Individual Project	7ENT1001		X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X
	Operations Management	7AAD0065				X	X	X	X			X	X	X	X	X		X			
	Control of Mechanical Systems	7AAD0021	X	X			X	X			X	X	X	X				X	X		
	Operations Research	7AAD0049	X	X		X	X	X	X	X	X	X	X		X				X	X	
	FEA and Applications	7ENT1026			X	X	X	X		X				X		X		X	X		

Knowledge and Understanding

- A1. The advanced CAE and simulation methods employed by aerospace engineers.
- A2. The fundamental sciences appropriate to aerospace engineering.
- A3. Appropriate research methods employed in analysis of technical and commercial problems.
- A4. The product/process definition and systems design process.

Intellectual Skills

- B1. Analyse and solve engineering problems using appropriate techniques.
- B2. Design/model/analyse relevant engineering systems/subsystems.
- B3. Critically review and select appropriate research methods to solve engineering and commercial problems.
- B4. Evaluate external influences on the design process.

Practical Skills

- C1. Apply appropriate experimental, analytical and modelling techniques to a range of aerospace engineering problems and draw conclusions.
- C2. Use advanced computer-aided engineering tools.
- C3. Prepare technical documentation.
- C4. Evaluate the design of appropriate systems, components or processes.
- C5. Plan and manage a project, taking into account commercial, industrial and resource constraints.

Transferable Skills

- D1. Communicate information effectively, orally and/or in writing.
- D2. Manage time and resources effectively.
- D3. Work effectively individually and/or within a team.
- D4. Solve problems in a logical and coherent manner.
- D5. Manipulate, sort and present data.
- D6. Learn effectively and independently, in preparation for lifelong learning.

MSc Automotive Engineering

		Programme Learning Outcomes (as identified in section 1 and below)																			
		Knowledge & Understanding				Intellectual Skills				Practical Skills					Transferable Skills						
Module Title		Module Code	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5	D6
Level 7	Integrated Product Engineering	7AAD0058			X	X	X	X		X				X	X	X		X	X		
	CFD Techniques	7ENT1007	X	X			X	X			X	X	X	X		X			X	X	
	FEA and Applications	7ENT1026	X	X		X	X	X	X	X	X	X	X	X		X			X	X	
	Operations Research	7AAD0049	X	X		X	X	X	X	X	X	X	X	X		X			X	X	
	Automotive Dynamics & Safety	7AAD0054	X	X			X	X		X	X	X	X	X		X			X	X	
	MSc Individual Project	7ENT1001		X	X		X	X	X	X	X		X	X	X	X	X	X	X	X	X
	Advanced Engines & Power Systems	7AAD0061		X		X	X	X		X	X			X		X			X	X	
	Automotive Electrical Systems	7AAD0056		X		X	X	X		X	X			X		X			X	X	
	Automotive Materials & Manufacture	7AAD0057		X			X	X		X				X	X		X			X	

Knowledge and Understanding

- A1. The advanced CAE and simulation methods employed by automotive engineers.
- A2. The fundamental sciences appropriate to automotive engineering.
- A3. Appropriate research methods employed in analysis of technical and commercial problems.
- A4. The product/process definition and systems design process.

Intellectual Skills

- B1. Analyse and solve engineering problems using appropriate techniques.
- B2. Design/model/analyse relevant engineering systems/subsystems.
- B3. Critically review and select appropriate research methods to solve engineering and commercial problems.
- B4. Evaluate external influences on the design process.

Practical Skills

- C1. Apply appropriate experimental, analytical and modelling techniques to a range of automotive engineering problems and draw conclusions.
- C2. Use advanced computer-aided engineering tools.
- C3. Prepare technical documentation.
- C4. Evaluate the design of appropriate systems, components or processes.
- C5. Plan and manage a project, taking into account commercial, industrial and resource constraints.

Transferable Skills

- D1. Communicate information effectively, orally and/or in writing.
- D2. Manage time and resources effectively.
- D3. Work effectively individually and/or within a team.
- D4. Solve problems in a logical and coherent manner.
- D5. Manipulate, sort and present data.
- D6. Learn effectively and independently, in preparation for lifelong learning.

MSc Mechanical Engineering

		Programme Learning Outcomes (as identified in section 1 and below)																			
		Knowledge & Understanding				Intellectual Skills				Practical Skills					Transferable Skills						
Module Title	Module Code	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5	D6	
Level 7	Control of Mechanical Systems	7AAD0021	X	X			X	X			X	X	X	X					X	X	
	Dynamics and Performance of Mechanical Systems	7AAD0068	X	X			X	X			X	X	X	X					X	X	
	FEA and Applications	7ENT1026	X	X		X	X	X	X	X	X	X	X	X		X			X	X	
	CFD Techniques	7ENT1007	X	X			X	X			X	X	X	X		X			X	X	
	MSc Individual Project	7ENT1001		X	X		X	X	X	X	X		X	X	X	X	X	X	X	X	X
	Operations Management	7AAD0065				X	X	X		X			X	X	X	X		X	X		
	Advanced Thermodynamics and Thermal Systems	7AAD0034		X			X	X			X		X	X					X	X	
	Operations Research	7AAD0049	X	X		X	X	X	X	X	X	X	X	X		X			X	X	
	Quality, Reliability & Maintenance	7AAD0055			X	X	X	X		X				X		X		X	X		

Knowledge and Understanding

- A1. The advanced CAE and simulation methods employed by mechanical engineers.
- A2. The fundamental sciences appropriate to mechanical engineering.
- A3. Appropriate research methods employed in analysis of technical and commercial problems.
- A4. The product/process definition and systems design process.

Intellectual Skills

- B1. Analyse and solve engineering problems using appropriate techniques.
- B2. Design/model/analyse relevant engineering systems/subsystems.
- B3. Critically review and select appropriate research methods to solve engineering and commercial problems.
- B4. Evaluate external influences on the design process.

Practical Skills

- C1. Apply appropriate experimental, analytical and modelling techniques to a range of mechanical engineering problems and draw conclusions.
- C2. Use advanced computer-aided engineering tools.
- C3. Prepare technical documentation.
- C4. Evaluate the design of appropriate systems, components or processes.
- C5. Plan and manage a project, taking into account commercial, industrial and resource constraints.

Transferable Skills

- D1. Communicate information effectively, orally and/or in writing.
- D2. Manage time and resources effectively.
- D3. Work effectively individually and/or within a team.
- D4. Solve problems in a logical and coherent manner.
- D5. Manipulate, sort and present data.
- D6. Learn effectively and independently, in preparation for lifelong learning.

MSc Manufacturing Management

		Programme Learning Outcomes (as identified in section 1 and below)																					
		Knowledge & Understanding					Intellectual Skills						Practical Skills				Transferable Skills						
Module Title		Module Code	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	B6	C1	C5	C6	C7	D1	D2	D3	D4	D6
Level 7	Operations Management	7AAD0065		X		X	X		X	X		X	X			X	X	X	X		X	X	
	Financial Control	7AAD0060	X					X		X			X		X				X				
	Integrated Product Engineering	7AAD0058		X					X	X		X	X			X			X		X	X	
	Operations Research	7AAD0049				X	X	X	X	X		X	X		X		X		X			X	
	Manufacturing Information Systems	7AAD0059		X			X		X					X	X			X	X			X	
	MSc Individual Project	7ENT1001		X			X	X	X	X	X	X		X	X	X			X	X	X	X	X
	Procurement & Supply Chain Management	7AAD0050			X							X	X						X		X		
	Manufacturing Strategy	7AAD0064	X				X		X			X							X				
	Quality, Reliability & Maintenance	7AAD0055		X					X	X	X	X		X	X				X		X	X	

Knowledge and Understanding

- A5. The techniques relevant to the analysis of business strategy and planning.
- A6. The product definition and systems design process.
- A7. Relevant techniques for commercial and professional engineering practice.
- A8. Operations management techniques and processes in manufacturing and service sectors.
- A9. Resource management planning and systems implications.
- A10. The analytical techniques employed in management and process control.

Intellectual Skills

- B1. Analyse and solve engineering problems using appropriate techniques.
- B2. Design/model/analyse relevant engineering systems/subsystems.
- B3. Critically review and select appropriate research methods to solve engineering and commercial problems.
- B4. Evaluate external influences on the design process.
- B5. Identify the influence of resource related issues on operations and business.
- B6. Design appropriate management systems and processes.

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Practical Skills

- C1. Apply appropriate experimental, analytical and modelling techniques to a range of business applications and draw conclusions.
- C5. Plan and manage a project, taking into account commercial, industrial and resource constraints.
- C6. Appropriate evaluation of the resource constraint implications on management decision making.
- C7. Plan the effective implementation of appropriate management systems and processes.

Transferable Skills

- D1. Communicate information effectively, orally and/or in writing.
- D2. Manage time and resources effectively.
- D3. Work effectively individually and/or within a team.
- D4. Solve problems in a logical and coherent manner.
- D6. Learn effectively and independently, in preparation for lifelong learning.

MSc Operations and Supply Chain Management

		Programme Learning Outcomes (as identified in section 1 and below)																					
		Knowledge & Understanding								Intellectual Skills						Practical Skills				Transferable Skills			
Module Title		Module Code	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	B6	C1	C5	C6	C7	D1	D2	D3	D4	D6
Level 7	Operations Management	7AAD0065		X		X	X		X	X		X	X			X	X	X	X		X	X	
	Financial Control	7AAD0060	X					X		X			X		X				X				
	Procurement & Supply Chain Management	7AAD0050			X							X	X						X		X		
	Operations Research	7AAD0049				X	X	X	X	X	X	X			X		X		X			X	
	Manufacturing Information Systems	7AAD0059		X			X		X					X	X			X	X			X	
	MSc Individual Project	7ENT1001		X			X	X	X	X	X	X		X	X	X			X	X	X	X	X
	Human Resource Management	7AAD0062			X							X	X						X		X		
	Manufacturing Strategy	7AAD0064	X				X		X			X							X				
	Legal Aspects of Supply Chain	7LAW0155			X							X				X	X		X		X	X	X

Knowledge and Understanding

- A5. The techniques relevant to the analysis of business strategy and planning.
- A6. The product definition and systems design process.
- A7. Relevant techniques for commercial and professional engineering practice.
- A8. Operations management techniques and processes in manufacturing and service sectors.
- A9. Resource management planning and systems implications.
- A10. The analytical techniques employed in management and process control.

Intellectual Skills

- B1. Analyse and solve engineering problems using appropriate techniques.
- B2. Design/model/analyse relevant engineering systems/subsystems.
- B3. Critically review and select appropriate research methods to solve engineering and commercial problems.
- B4. Evaluate external influences on the design process.
- B5. Identify the influence of resource related issues on operations and business.
- B6. Design appropriate management systems and processes.

Practical Skills

- C1. Apply appropriate experimental, analytical and modelling techniques to a range of business applications and draw conclusions.
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- D6. Learn effectively and independently, in preparation for lifelong learning.