Course Handbook

BEng(Hons) Aerospace Engineering

MEng(Hons) Aerospace Engineering

2018-2019
Course Leader: Dr Darren Ansell
School of Engineering

Please read this Handbook in conjunction with the University's Student Handbook.

Contents

1. Welcome to the course

Welcome to Aerospace Engineering at UCLan. We hope to provide you with an interesting and challenging education, and to develop competences appropriate to Aerospace Engineering.

Please read the handbook carefully as it is a source of information on the academic, administrative and operational aspects of your course and it is intended to explain what is required of you. Feel free to discuss any aspects with myself or any member of the course team. Enjoy your time studying with us!

Dr Darren Ansell – Course Leader for MEng/BEng (Hons) Aerospace Engineering.

1.1 Rationale, aims and learning outcomes of the course

The MEng/BEng (Hons) Aerospace Engineering course aim is to develop graduates with a broad understanding of current technology and practice in aerospace engineering, covering the relevant aspects of vehicles, systems, design and analysis.

The course is three years (BEng) or four years (MEng) in duration, plus an extra year if an industrial placement is included. Satisfactory completion of an industrial placement leads to the award: MEng/BEng (Hons) Aerospace Engineering with Industrial Placement.

- Produce graduates with the knowledge, understanding and skills necessary for successful careers in aerospace engineering and for continuous professional development
- Develop the intellectual, practical and team-working skills to enable students to (a) identify, interpret and analyse engineering problems, (b) postulate, develop and assess possible solutions and (c) select, justify and deliver optimised solutions.
- Develop relevant personal skills to enable students to take responsibility for their own learning and development.
- Develop skills in the use of computing, planning and problem-solving methods, as well as the practice of effective communication.
- Provide degree courses that meet the needs of industry and satisfy the accreditation requirements of professional engineering institutions.
- (Specific to MEng) Produce graduates with the knowledge, understanding and skills necessary for technical leadership and specialisation.
- (Specific to Industrial Placement) Produce graduates with direct experience of the practice of engineering in industry and the operation of engineering companies.

The discipline of Aerospace Engineering encompasses a wide skills base and the emphasis of this course is placed on system-level design rather than that of individual component devices. By concentrating on the principles fundamental to multi-system integration, the course equips graduates with the knowledge, skills and confidence to thrive in the rapidly evolving field of aerospace engineering, produce designs suitable for a variety of applications and the transferrable skills to find employment in a diverse set of industrial and commercial sectors.

The full program specifications, including learning outcomes, are referenced in the Appendices.

1.2 Course Team

Names and contact details of the key members of the team:

Course Leader for MEng/BEng (Hons) Aerospace Engineering
Darren Ansell
Computing & Technology Building, room CM237☎
01772 89 5304, ✉ dansell@uclan.ac.uk

Lecturer for MEng/BEng (Hons) Aerospace Engineering Linghai Lu
Computing & Technology Building, room CM132☎
01772 89 3223, ✉ llu3@uclan.ac.uk

Lecturer for MEng/BEng (Hons) Aerospace Engineering
Jules Simo
Computing & Technology Building, room CM021☎
01772 89 3545, ✉ jsimo@uclan.ac.uk

Year Tutor for First Year Engineering students Muqi
Wulan
Computing & Technology Building, room CM037 ☎
01772 89 3247, ✉ mwulan@uclan.ac.uk

Retention Co-ordinator
Patrick Ryan
Computing & Technology Building, room CM024 ☎
01772 89 3273, ✉ pryan1@uclan.ac.uk

Industrial Placements Tutor Joel
Allison
Computing & Technology Building, room CM131 ☎
01772 89 3251, ✉ jallison@uclan.ac.uk

1.3 Expertise of staff

Your course leader Dr Darren Ansell spent fifteen years in industry as an aerospace engineer prior to joining UCLan and is undertaking ground breaking research in unmanned vehicle research, aerospace materials and intelligent systems. Darren also acts as an academic advisor.

Course lecturer Linghai Lu teaches Aerospace Vehicles modules and is an expert in flight simulation. Linghai is dedicated professional with 10+ years' experience in the aerospace field. Specialises in maximising aircraft performance and safety through developing innovative methodologies. Linghai also acts as an academic advisor.

Course lecturer Dr.Jules Simo's research interests include orbital mechanics, space mission analysis and design, solar sail mission applications, robotics and autonomous systems, dynamical systems theory. Recent work focused on the guidance and control of space systems as well the application of multidisciplinary optimisation and artificial intelligence techniques to systems engineering. Jules also acts as an academic advisor.

1.4 Academic Advisor

You will be assigned an Academic Advisor who will provide additional academic support during the year. They will be the first point of call for many of the questions that you might have during the year. Your Academic Advisor will be able to help you with personal development, including developing skills in self-awareness, reflection and action planning.

1.5 Administration details

Campus Admin Services provides academic administration support for students and staff and are located in the following hubs which open from 8.45am until 5.15pm Monday to Thursday and until 4.00pm on Fridays. The hub can provide general assistance and advice regarding specific processes such as extenuating circumstances, extensions and appeals.

Allen Building
Medicine
Dentistry
telephone: 01772 895566
email: AllenHub@uclan.ac.uk

Harris Building
Lancashire Law School
Humanities and the Social Sciences
Centre for Excellence in Learning and Teaching
telephone: 01772 891996/891997
email: HarrisHub@uclan.ac.uk

Foster Building
Forensic and Applied Sciences
Pharmacy and Biomedical Sciences
Psychology
Physical Sciences
telephone: 01772 891990/891991
email: FosterHub@uclan.ac.uk

Computing and Technology Building
Art, Design and Fashion
Computing
Journalism, Media and Performance
Engineering
telephone: 01772 891994/891995
email: CandTHub@uclan.ac.uk

Greenbank Building
Sport and Wellbeing
Management
Business
telephone: 01772 891992/891993
email: GreenbankHub@uclan.ac.uk

Brook Building
Community, Health and Midwifery
Nursing
Health Sciences
Social Work, Care and Community
telephone: 01772 891992/891993
email: BrookHub@uclan.ac.uk

1.6 Communication

The University expects you to use your UCLan email address and check regularly for messages from staff. If you send us email messages from other addresses they risk being filtered out as potential spam and discarded unread.

The School of Engineering will primarily contact you via your UCLan email address, but you should also regularly check the Starfish system (student relationship management software). Details on how to do this will be given during your induction weeks, and by your academic advisors. Students can contact staff members by email, but please be aware that staff members may at times be away on business or research trips and not always have immediate access to email. In the event you need to contact a member of staff urgently then you are free to contact any other members of the aerospace team detailed above. Appointments with staff should be made via email or by using the Starfish system.

1.7 External Examiner

The University has appointed an External Examiner to your course who helps to ensure that the standards of your course are comparable to those provided at other higher education institutions in the UK. The name of this person, their position and home institution can be found below.

Dr Andrew Pinkerton, CEng, FIMechE,
Senior Lecturer, Engineering Department, Lancaster University, UK.

External Examiner reports for the Engineering courses can be accessed electronically via the Engineering@UCLan Blackboard pages.

2. Structure of the course

2.1 Overall structure

Table 1 and Table 2 illustrate the programme structure for BEng (Hons) and MEng (Hons) courses respectively. These courses exist as part of the Modular Credit Accumulation and Transfer Scheme (MODCATS). The award requires that a student pass 360 credits total for BEng (Hons), or 480 credits for MEng (Hons).

Each full-time year of study requires you to pass modules to the value of 120 credits. Most modules on the programmes are standard sized and worth 20 credits, although there are examples of modules worth 10, 30 and 40 credits. Students wishing to follow part time study are counselled by a member of staff and a suitable programme of study developed.

Please note that the programme structures may be subject to minor modifications to reflect improvements/developments in the course or within industry. If this is the case your current year of study will not be affected and you will be notified of the changes for future year(s) of study.
There is also a foundation entry route and details of course structure can be found in the appendix.

BEng(Hons) Aerospace Engineering

	Level Four		
	Module code	**Module title**	**Credit value**
	Compulsory modules		
	ER1631	Aerospace Vehicles	30
	ER1020	Engineering Design	30

	ER1030	Engineering Science	30
	ER1010	Engineering Analysis	30

	Level Five		
	Module code	**Module title**	**Credit value**
	Compulsory modules		
	EI 2010	Aircraft Design and Manufacture	20
	EI 2020	Systems Design and Computing	20
	EI 2910	Structures and FEA	20
	MP 2576	Thermofluids	20
	SC2153	Further Engineering Mathematics and Simulation	20
	MP 2721	Operations Management A	20

	Option		
	EI 3999	Industrial Placement	120

	Level Six		
	Module code	**Module title**	**Credit value**
	Compulsory modules		
	EI 3000	Individual Project	20
	EI 3010	Flight Dynamics and Control	20
	EI 3030	Aeromechanics	20
	EI 3040	Aerospace Propulsion	20
	MP 3604	Advanced CAD	20
	MP 3732	Operations Management B	20

Table 1 BEng Aerospace Engineering Programme Structure

MEng(Hons) Aerospace Engineering

	Level Four		
	Module code	**Module title**	**Credit value**
	Compulsory modules		
	ER1631	Aerospace Vehicles	30
	ER1020	Engineering Design	30
	ER1030	Engineering Science	30
	ER1010	Engineering Analysis	30

	Level Five		
	Module code	**Module title**	**Credit value**
	Compulsory modules		
	EI 2010	Aircraft Design and Manufacture	20
	EI 2020	Systems Design and Computing	20
	EI 2910	Structures and FEA	20
	MP 2576	Thermofluids	20

	SC2153	Further Engineering Mathematics and Simulation	20
	MP 2721	Operations Management A	20

	Option		
	EI 3999	Industrial Placement	120

	Level Six		
	Module code	**Module title**	**Credit value**
	Compulsory modules		
	EI 3000	Individual Project	20
	EI 3010	Flight Dynamics and Control	20
	EI 3030	Aeromechanics	20
	EI 3040	Aerospace Propulsion	20
	MP 3604	Advanced CAD	20
	MP 3732	Operations Management B	20

	Level Seven		
	Module code	**Module title**	**Credit value**
	Compulsory modules		
	EI 4000	Aerospace Design Project	40
	EI 4900	Computational Modelling	20
	MP 4580	Engineer and Society	20
	Optional modules		
	EI 4010	Aerospace Vehicle Simulation	20
	EI 4030	Aircraft Flight Physics	20
	EI 4035	Aerospace Structures and Materials	20
	EI 4050	Aerospace Operations	20

Table 2 MEng Aerospace Engineering Programme Structure

2.2 Modules available

Each module is a self-contained block of learning with defined aims, learning outcomes and assessment. A standard module is worth 20 credits. It equates to the learning activity expected from one sixth of a full-time undergraduate year. Modules may be developed as half or double modules with credit allocated up to a maximum of 120 credits per module. Module codes are as shown in Table 1 and 2 above.

2.3 Course requirements

All modules in the B.Eng course are compulsory. In the M.Eng course, there are optional modules at Level 7 (typically in your fourth year of study) but we cannot guarantee all options will be available, depending on demand.

Most modules include formal written examinations, but some are assessed by coursework and/or project work.

It is important that international students are familiar with English language proficiency requirements, together with visa and immigration requirements.

2.4 Progression Information

Discussions about your progression through the course normally take place in February each year. It is an opportunity for you to make plans for your study over the next academic year. The course team will tell you about the various modules / combinations available and you will both agree on the most appropriate (and legal) course of study for you.

2.5 Study Time

2.5.1 Weekly timetable

Timetables are accessible online through the UCLan Student Portal:

https://dailytimetable.uclan.ac.uk/

2.5.2 Expected hours of study

As outlined in the school handbook the normal amount of work involved in achieving a successful outcome to your studies is to study for 10 hours per each credit you need to achieve – this includes attendance at UCLan and time spent in private study.

This requirement translates to a total of 6 hours per 20 credit module per week. We expect that you commit 36 hours study per week (pro-rata for part-time students and/or semester-based modules), inclusive of your contact hours. So for a typical module you may have a 2 hour lecture, and a 1 hour tutorial, leaving you approximately 3 hours for self-directed study (further reading, tutorial questions, assignments, revision). Often you will be working in groups for practical work and you should try and arrange to meet up outside the scheduled class times. You will also need to use equipment such as computer and laboratory facilities for practical work, again sometimes outside the scheduled class times.

2.5.3 Attendance Requirements

You are required to attend all timetabled learning activities for each module. Notification of illness or exceptional requests for leave of absence must be made as follows:

Students should report non-attendance to the hub email – CandTHubAttendance@uclan.ac.uk or by telephoning the hub on 01772 891994 or 01772 891995.

You are encouraged to seek the advice of your Academic Adviser and/or Course Leader if your personal circumstances make it difficult to meet your study obligations.

3. Approaches to teaching and learning

3.1 Learning and teaching methods

Aerospace Engineering programmes use a number of different assessment techniques that will allow you to demonstrate your understanding of concepts and issues covered. These may be broadly categorised as ‘examination’ and ‘coursework’, but several different types are used, e.g. open-book exams, closed-book exams, laboratory reports, practical assessments in the laboratory, computer simulation and analysis, written reports etc.

Evidence of achievement, upon which assessment will be based, will be gained through a programme of practical exercises, assignments and exams. Each week you may be involved in some practical work such as a laboratory exercise, a computer-based assignment, group or individual project work etc. You will often work in groups and make group presentations but you will write up and submit work individually so that you gain credit for your contribution, not that of somebody else.

It should be emphasised that the purpose of assessment is to not only grade you, and provide information to facilitate management of the course, but also to provide feedback to you. In this way

you can monitor your own progress, refine your own judgement of your abilities and regulate it accordingly.

You should keep all the returned work in a file and you may have to submit this at the end of the year for the external examiners to assess.

Individual module leaders will distribute information on the methods of assessment used, and their weighting, at the start of each module.

3.2 Study skills

There are a variety of services to support students and these include

WISER http://www.uclan.ac.uk/students/study/wiser/index.php

3.3 Learning resources

3.3.1 Learning Information Services (LIS)

At UCLan all laboratories, workshops and other specialised equipment and facilities are centrally managed, thus making them available to users right across the campus. For further information please visit:

http://www.uclan.ac.uk/students/study/specialist_teaching_resources/index.php

3.4 Personal development planning

Your academic advisor will help you to develop a personal development plan through your course of meetings with him or her. This plan will help you to gain important skills and experiences which will help prepare you for your future careers.

3.5 Preparing for your career

We encourage all students to seek out extra-curricular opportunities to enhance your learning and development during the course of your studies. Examples include industrial placements, assisting academic research staff with research projects and wider activities.

4. Student Support

Within the school of engineering, in the first instance please contact your academic advisor if you require any support. There are helpful guides available online too, just visit:

http://www.uclan.ac.uk/students/

4.1 Academic Advisors

As a new student within the School of Engineering at the University of Central Lancashire (UCLan) you will be allocated to an academic advisor, who will work with you individually and in small groups to provide you with general support and guidance and to monitor your progress. Your academic advisor will be one of the team of academics that will teach you on your course whilst studying here at UCLan. You will be notified of your academic advisor and be given their contact details early in the academic year.

4.2 Students with disabilities

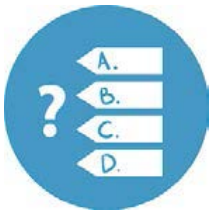
If you have a disability that may affect your studies, please either contact the Disability Advisory Service - disability@uclan.ac.uk - or let one of the course team know as soon as possible. With your agreement information will be passed on to the Disability Advisory Service. The University will make reasonable adjustments to accommodate your needs and to provide appropriate support for you to complete your study successfully. Where necessary, you will be asked for evidence to help identify appropriate adjustments.

Arrangements are made for students who have a disability/learning difficulty for which valid supporting evidence can be made available. Contact the Disability Adviser for advice and information, disability@uclan.ac.uk

4.3 Students' Union One Stop Shop

The Opportunities Centre is the Union's One Stop Shop to find employment or volunteering whilst you study. With thousands of jobs and voluntary positions advertised, agency work through the Bridge and information on over 2000 volunteer positions within the Union.

5. Assessment



5.1 Assessment Strategy

Please note that all modules will be assessed. You are expected to attempt all required assessments for each module for which you are registered, and to do so at the times scheduled unless authorised extensions, special arrangements for disability, or extenuating circumstances allow you to defer your assessment.

Your module leaders will provide information of the assessment strategy used during each series of module lectures/workshops and they are also detailed on the course specification documents.

5.2 Notification of assignments and examination arrangements

This information will be provided within your course supplement handbook and in your module information packs.

5.3 Referencing

You will be required to reference within your assignments. Referencing is important in acknowledging where you have gathered information from and to give credit to the authors of the work. Please note that if your work is not referenced correctly then this may be taken as plagiarism. Refer to your course supplement handbook for guidance on the correct referencing style to use.

5.4 Confidential material

Guidance on confidential information and ethical guidelines will be provided by the module leader and within the module information pack.

5.5 Cheating, plagiarism, collusion or re-presentation

Please refer to the information included in section 6.6 of the University Student Handbook for full definitions. The University uses an online Assessment Tool called Turnitin. A pseudo-Turnitin assignment will be set up using the School space on Blackboard to allow students to check as many drafts as the system allows before their final submission to the 'official' Turnitin assignment. Students are required to self-submit their own assignment on Turnitin and will be given access to the Originality Reports arising from each submission. In operating Turnitin, Schools must take steps to ensure that the University's requirement for all summative assessment to be marked anonymously is not undermined and therefore Turnitin reports should either be anonymised or

considered separately from marking. Turnitin may also be used to assist with plagiarism detection and collusion, where there is suspicion about individual piece(s) of work.

6. Classification of Awards

The University publishes the principles underpinning the way in which awards and results are decided in Academic Regulations. Decisions about the overall classification of awards are made by Assessment Boards through the application of the academic and relevant course regulations.

7. Student Feedback

You can play an important part in the process of improving the quality of this course through the feedback you give. Module and course leaders are always interested in your feedback and it is invaluable to continually improve the course. You can also get involved in more formal student staff liaison committee meetings too (see below).

7.1 Student Staff Liaison Committee meetings (SSLCs)

Details of the Protocol for the operation of SSLCs is included in section 8.2 of the University Student Handbook.

8. Appendices

8.1 Programme Specification(s)

8.1.2. Aerospace Engineering M.Eng (Hons) & Aerospace Engineering B.ENg (Hons)

UNIVERSITY OF CENTRAL LANCASHIRE

Programme Specification

This Programme Specification provides a concise summary of the main features of the programme and the 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.

Sources of information on the programme can be found in Section 17

1. Awarding Institution / Body	University of Central Lancashire
2. Teaching Institution and Location of Delivery	University of Central Lancashire
3. University School/Centre	Computing, Engineering and Physical Sciences
4. External Accreditation	Royal Aeronautical Society (RAeS) Institution of Mechanical Engineers (IMechE) *(Accreditation is currently being sought)*
5. Title of Final Award	MEng (Hons) Aerospace Engineering.
6. Modes of Attendance offered	Full Time Sandwich
7. UCAS Code	6L13 4Q67
8. Relevant Subject Benchmarking Group(s)	QAA Engineering (2010)
9. Other external influences	UK Engineering Council (EC-UK) QAA Academic Infrastructure
10. Date of production/revision of this form	June 2017

11. Aims of the Programme
• Produce graduates with the knowledge, understanding and skills necessary for successful careers in aerospace engineering and for continuous professional development
• Develop the intellectual, practical and team-working skills to enable students to (a) identify, interpret and analyse engineering problems, (b) postulate, develop and assess possible solutions and (c) select, justify and deliver optimised solutions.

- Develop relevant personal skills to enable students to take responsibility for their own learning and development.
- Develop skills in the use of computing, planning and problem-solving methods, as well as the practice of effective communication.
- Provide degree courses that meet the needs of industry and satisfy the accreditation requirements of professional engineering institutions.
- (***Specific to MEng***) Produce graduates with the knowledge, understanding and skills necessary for technical leadership and specialisation.
- (***Specific to Industrial Placement***) Produce graduates with direct experience of the practice of engineering in industry and the operation of engineering companies.

12. Learning Outcomes, Teaching, Learning and Assessment Methods

FOR INFORMATION
EC-UK learning outcomes are cross-referenced in brackets (either by category of outcomes or by individual outcomes)

A. Knowledge and Understanding

A1. Extensive knowledge and understanding of essential facts, concepts, theories and principles of aerospace engineering, and its underpinning science and mathematics. [*A1, US*]

A2. In-depth understanding of the wider multidisciplinary engineering context and its underlying principles. [*A2*]

A3. Ability to apply social, environmental, ethical, economic and commercial considerations affecting the exercise of engineering judgement. [*A3, S*]

A4. Ability to learn and apply new theories, concepts, methods etc. in unfamiliar situations. [*A4*]

Teaching and Learning Methods

Lectures, Seminars and Tutorials	A1, A2, A3
Active Learning	A3, A4
Practical Sessions	A1
Supervised Workshops	n/a
Project Reviews	A1, A2

Assessment methods

Written Exam	A1, A2
Coursework	A1, A2, A3
Practical Assessment	A1, A2, A3

B. Subject-specific skills

B1. Extensive practical engineering skills (acquired through laboratories, workshops, design, etc.) and show evidence of team-working, project participation and leadership abilities. [*B1*]

B2. Systematic use of engineering analysis in order to interpret problems, assess technologies, propose solutions, implement processes and enable continuous improvement. [*E*]

B3. Creation/development of viable products, processes and systems and ensure fitness for purpose. [*D*]

B4. Appropriate application of resources, methods, tools and processes in engineering practice. [*P*]

Teaching and Learning Methods

Lectures, Seminars and Tutorials	B2, B4
Active Learning	B2
Practical Sessions	B1, B4
Supervised Workshops	B1, B3
Project Reviews	B1

Assessment methods

Written Exam	B2
Coursework	B1, B2, B3, B4
Practical Assessment	B1, B3

C. Thinking Skills

C1. Apply appropriate quantitative science and engineering tools to the analysis of problems. [*C1*]

C2. Demonstrate creative and innovative ability in synthesising solutions and in formulating designs. [*C2*]

C3. Comprehend the broad picture and thus work with an appropriate level of detail. [*C3*]

C4. Develop, monitor and update a plan, to reflect a changing operating environment. [*C4*]

Teaching and Learning Methods

Lectures, Seminars and Tutorials	C1
Active Learning	C2
Practical Sessions	C1
Supervised Workshops	n/a
Project Reviews	C3, C4

Assessment methods

Written Exam	C1
Coursework	C2, C3, C4
Practical Assessment	C1

D. Other skills relevant to employability and personal development

D1. Possess developed transferable skills that will be of value in a wide range of situations, including problem-solving; communication; and working with others. [*D1*]

D2. Make effective use of information technology and information retrieval skills. [*D2*]

D3. Plan self-learning and improve performance as the foundation for lifelong learning and continuing professional development. [*D3*]

D4. Monitor and adjust a personal programme of work on an on-going basis, and learn independently. [*D4*]

Teaching and Learning Methods

Lectures, Seminars and Tutorials	D1, D3, D4
Active Learning	n/a
Practical Sessions	D2
Supervised Workshops	n/a
Project Reviews	D1

Assessment methods

Written Exam	n/a
Coursework	D3, D4
Practical Assessment	D1, D2

13. Programme Structures

Level	Module Code	Module Title (C) for Core, (COMP) for Compulsory and (O) for Optional	Credit Rating
Level 7	EI 4000	Aerospace Group Design (COMP)	40
	EI 4900	Computational Modelling (COMP)	20
	MP4580	Engineer and Society (COMP)	20
		Select TWO Options:	
	EI 4010	Aerospace Vehicle Simulation (O)	20
	EI 4030	Aircraft Flight Physics (O)	20
	EI 4035	Aerospace Structures and Materials (O)	20
	EI 4050	Aerospace Operations (O)	20
Level 6	EI 3000	Individual Project (C)	20
	EI 3010	Flight Dynamics and Control (COMP)	20
	EI 3030	Aeromechanics (COMP)	20
	EI 3040	Aerospace Propulsion (COMP)	20
	MP3604	Advanced CAD (COMP)	20
	MP3732	Operations Management B (COMP)	20
	EI 3999	Industrial Placement (O)	120
Level 5	EI 2010	Aircraft Design and Manufacture (COMP)	20
	EI 2020	Systems Design and Computing (COMP)	20
	EI 2910	Structures and FEA (COMP)	20
	MP2576	Thermofluids (COMP)	20

14. Awards and Credits

MEng (Hons) Aerospace Engineering

480 credits including 220 credits at Level 6 or above and 120 credits at Level 7.

Industrial placement route requires successful completion of EI3999 which has a notional credit of 120 credits.

BEng (Hons) Aerospace Engineering

360 credits including 220 credits at Level 5 or above and 100 credits at Level 6 or above.

BEng Aerospace Engineering

320 credits including 180 credits at Level 5 or above and 60 credits at Level 6 or above.

Diploma of Higher Education

240 credits including 100 credits at Level 5 or above.

	SC2153 MP2721	Further Engineering Mathematics and Simulation (COMP) Operations Management A (COMP)	20 20	
Level 4	ER1010 ER1020 ER1030 ER1631	Engineering Analysis (COMP) Engineering Design (COMP) Engineering Science (COMP) Aerospace Vehicles (COMP)	30 30 30 30	**Certificate of Higher Education** 120 credits including 100 credits at Level 4 or above.

15. Personal Development Planning

Professional development is an integral part of the course and includes sessions on personal qualities, self-management, effective communication and academic assessments, as well as professional and career management.

Services are available UCLan Student Support. Students are encouraged to consider "WISER", which offers help in learning how to study more effectively and how to communicate at an advanced and professional level.

Specific guidance on engagement, influence and impact is provided for project-based modules:

EI 2010 Aircraft Design and Manufacture
EI 2020 Systems Design and Computing
EI 3000 Individual Project
EI 4000 Aerospace Group Project

This is reinforced by the personal tutorial system. Each student will be allocated to a named lecturer who will act as Personal Tutor for all years of study.

Preparation for "EI 3999 Industrial Placement" will commence at the start of the preceding year and will include advice and assistance on how to secure employment (e.g. how to complete application forms, how to write a CV and a covering letter, how to present at interview). While there are no pre-arranged placements and no guarantees of securing a placement, the programme team will offer positive support where practicable. Students who do secure an industrial placement will be allocated a Placement Tutor who will visit UK-based workplaces during that year.

16. Admissions criteria*
(including agreed tariffs for entry with advanced standing)
**Correct as at date of approval. For latest information, please consult the University's website.*

All applicants must have achieved GCSE English at Grade C or above, or an equivalent qualification.

Entry requirement in **2015** for **MEng (Hons) Aerospace Engineering** is **300 points** or above:

GCE A2: BBB including Maths, Physics and a STEM subject.
OR
BTEC Extended Diploma in Engineering: DDM including Mathematics for Engineering Technicians (Unit 4, Minimum D), Further Mathematics for Engineering Technicians (Unit 28) and Mechanical Principles and Applications (Unit 5)
OR
Equivalent qualifications

Entry requirement from **2016** for **MEng (Hons) Aerospace Engineering** is **340 points** or above:

GCE A2: AAB including Maths, Physics and a STEM subject.
OR
BTEC Extended Diploma in Engineering: DDD including Mathematics for Engineering Technicians (Unit 4),, Further Mathematics for Engineering Technicians (Unit 28) and Mechanical Principles and Applications (Unit 5)
OR
Equivalent qualifications

Applications will be welcomed from individuals with non-standard qualifications or relevant work experience who can demonstrate the ability to cope with and benefit from degree-level studies. Those who have not

studied recently may be required to undertake a foundation programme prior to entry to Aerospace Engineering.

17. Key sources of information about the programme

- **Internal**
  http://www.uclan.ac.uk/courses/meng_aerospace_engineering.php
- **External**
  http://www.engc.org.uk/professional-qualifications/standards/uk-spec
  http://www.qaa.ac.uk/en/Publications/Documents/Subject-benchmark-statement-Engineering-.pdf
  http://www.qaa.ac.uk/publications/information-and-guidance
  http://www.aerosociety.com/Assets/Docs/Membership/AccreditationHandbook.pdf
  http://www.imeche.org/docs/default-source/tapd/acd001-annex-1-academic-accreditation-guidelines.doc?sfvrsn=4

18. Curriculum Skills Map

Level	Module Code	Module Title	Core (C), Compulsory (COMP) or Option (O)	Programme Learning Outcomes															
				Knowledge and understanding				Subject-specific Skills				Thinking Skills				Other Skills			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
LEVEL 7	EI 4000	Aerospace Group Project	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EI 4010	Aerospace Vehicle Simulation	O	✓	✓			✓	✓	✓	✓	✓	✓		✓				
	EI 4030	Aircraft Flight Physics	O	✓	✓				✓		✓	✓							
	EI 4035	Aerospace Structures and Materials	O	✓	✓				✓		✓	✓							
	EI 4050	Aerospace Operations	O	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓				
	EI 4900	Computational Modelling	COMP	✓				✓	✓	✓		✓		✓	✓	✓			
	MP4580	Engineer and Society	COMP	✓	✓	✓				✓	✓			✓		✓		✓	
LEVEL 6	EI 3000	Individual Project	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EI 3010	Flight Dynamics and Control	COMP	✓				✓	✓		✓	✓							
	EI 3030	Aeromechanics	COMP	✓					✓		✓	✓							
	EI 3040	Aerospace Propulsion	COMP	✓					✓		✓	✓							
	EI 3999	Industrial Placement	O	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	
	MP3604	Advanced CAD	COMP	✓		✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	
	MP3732	Operations Management B	COMP	✓	✓	✓			✓	✓	✓	✓	✓	✓				✓	
LEVEL 5	EI 2010	Aircraft Design and Manufacture	COMP	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓
	EI 2020	Systems Design and Computing	COMP	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓
	EI 2910	Structures and FEA	COMP	✓				✓	✓	✓	✓	✓	✓				✓	✓	
	MP2576	Thermo-fluids	COMP	✓				✓	✓	✓	✓	✓	✓				✓	✓	
	SC2153	Further Eng Mathematics and Simul	COMP	✓				✓	✓	✓	✓		✓				✓	✓	
	MP2721	Operations Management A	COMP	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓				✓	
LEVEL 4	ER1631	Aerospace Vehicles	COMP	✓	✓				✓			✓							
	ER1020	Engineering Design	COMP	✓				✓								✓	✓	✓	
	ER1030	Engineering Science	COMP	✓	✓			✓	✓	✓		✓				✓		✓	
	ER1010	Engineering Analysis	COMP	✓					✓			✓	✓					✓	

19. LEARNING OUTCOMES FOR EXIT AWARDS:

For **each exit award available**, list learning outcomes relating to the knowledge and understanding, subject specific skills, thinking, other skills relevant to employability and personal development that a typical student might be expected to gain as a result of successfully completing each level of a course of study.

For example, for a standard BA/BSc (Hons) award the exit award learning outcomes for CertHE (Level 4) and DipHE (Level 5), BA/BSc (Level 6) should be included; for a postgraduate Masters, this would normally be PGDip and PGCert.

Learning outcomes for the award of: CertHE

Demonstrate knowledge and understanding of some of the essential facts, concepts, theories and principles of aerospace engineering, and its underpinning science and mathematics.

Appreciation of some aspects of the wider multidisciplinary engineering context and its underlying principles.

Practical engineering skills (acquired through laboratories, workshops, design, etc.) and show evidence of team-working, and project participation.

Attempt to systematic use of engineering analysis in order to interpret problems, assess technologies, propose solutions, implement processes and enable continuous improvement.

Creation/development of some aspects of viable products, processes and systems and ensure fitness for purpose.

Apply appropriate quantitative science and engineering tools to the analysis of problems.

Demonstrate some level of creative and innovative ability in synthesising solutions and in formulating designs.

Possess some transferable skills that will be of value in a wide range of situations, including problem-solving; communication; and working with others.

Make effective use of some aspects of information technology and information retrieval skills.

Plan some aspects of self-learning and improve performance as the foundation for lifelong learning and continuing professional development.

Learning outcomes for the award of: DipHE

Demonstrate knowledge and understanding of many aspects of essential facts, concepts, theories and principles of aerospace engineering, and its underpinning science and mathematics.

Appreciation of many aspects of the wider multidisciplinary engineering context and its underlying principles.

Appreciation of many aspects of the social, environmental, ethical, economic and commercial considerations affecting the exercise of engineering judgement.

Ability to learn appropriate level of new theories, concepts, methods etc. in unfamiliar situations.

Practical engineering skills (acquired through laboratories, workshops, design, etc.) and show evidence of team-working, project participation and leadership abilities.

Systematic use of engineering analysis in order to interpret problems, assess technologies, propose solutions, implement processes and enable continuous improvement.

Creation/development of many aspects of viable products, processes and systems and ensure fitness for purpose.

Appropriate application of resources, methods, tools and processes in engineering practice.

Apply appropriate quantitative science and engineering tools to the analysis of problems.

Demonstrate high level of creative and innovative ability in synthesising solutions and in formulating designs.

Comprehend the broad picture and thus work with an appropriate level of detail.

Develop, monitor and update many aspects of a plan, to reflect a changing operating environment.

Possess many transferable skills that will be of value in a wide range of situations, including problem-solving; communication; and working with others.

Make effective use of appropriate information technology and information retrieval skills.

Plan self-learning and improve performance as the foundation for lifelong learning and continuing professional development.

Monitor and adjust some aspects of a personal programme of work on an on-going basis, and learn independently.

Learning outcomes for the award of: BEng

Demonstrate knowledge and understanding of much of essential facts, concepts, theories and principles of aerospace engineering, and its underpinning science and mathematics.

Appreciation of the wider multidisciplinary engineering context and its underlying principles.

Appreciation of the social, environmental, ethical, economic and commercial considerations affecting the exercise of engineering judgement.

Ability to learn new theories, concepts, methods etc. in unfamiliar situations.

Practical engineering skills (acquired through laboratories, workshops, design, etc.) and show evidence of team-working, project participation and leadership abilities.

Systematic use of engineering analysis in order to interpret problems, assess technologies, propose solutions, implement processes and enable continuous improvement.

Creation/development of viable products, processes and systems and ensure fitness for purpose.

Appropriate application of resources, methods, tools and processes in engineering practice.

Apply appropriate quantitative science and engineering tools to the analysis of problems.

Demonstrate creative and innovative ability in synthesising solutions and in formulating designs.

Comprehend the broad picture and thus work with an appropriate level of detail.

Develop, monitor and update a plan, to reflect a changing operating environment.

Possess many transferable skills that will be of value in a wide range of situations, including problem-solving; communication; and working with others.

Make effective use of information technology and information retrieval skills.

Plan self-learning and improve performance as the foundation for lifelong learning and continuing professional development.

Monitor and adjust a personal programme of work on an on-going basis, and learn independently.

Learning outcomes for the award of: BEng (Hons)

Demonstrate knowledge and understanding of essential facts, concepts, theories and principles of aerospace engineering, and its underpinning science and mathematics.

Consider and apply wider multidisciplinary engineering context and its underlying principles into practice.

Appreciation of the social, environmental, ethical, economic and commercial considerations affecting the exercise of engineering judgement.

Ability to learn and apply new theories, concepts, methods etc. in unfamiliar situations.

Practical engineering skills (acquired through laboratories, workshops, design, etc.) and show evidence of team-working, project participation and leadership abilities.

Systematic use of engineering analysis in order to interpret problems, assess technologies, propose solutions, implement processes and enable continuous improvement.

Creation/development of viable products, processes and systems and ensure fitness for purpose.

Appropriate application of resources, methods, tools and processes in engineering practice.

Apply appropriate quantitative science and engineering tools to the analysis of problems.

Demonstrate creative and innovative ability in synthesising solutions and in formulating designs.

Comprehend the broad picture and thus work with an appropriate level of detail.

Develop, monitor and update a plan, to reflect a changing operating environment.

Possess developed transferable skills that will be of value in a wide range of situations, including problem-solving; communication; and working with others.

Make effective use of information technology and information retrieval skills.

Plan self-learning and improve performance as the foundation for lifelong learning and continuing professional development.

Monitor and adjust a personal programme of work on an on-going basis, and learn independently.

Learning outcomes for the award of: MEng (Hons)

Extensive knowledge and understanding of essential facts, concepts, theories and principles of aerospace engineering, and its underpinning science and mathematics.

In-depth understanding of wider multidisciplinary engineering context and its underlying principles into practice.

Ability to apply social, environmental, ethical, economic and commercial considerations affecting the exercise of engineering judgement.

Ability to learn and apply new theories, concepts, methods etc. in unfamiliar situations.

Extensive practical engineering skills (acquired through laboratories, workshops, design, etc.) and show evidence of team-working, project participation and leadership abilities.

Systematic use of engineering analysis in order to interpret problems, assess technologies, propose solutions, implement processes and enable continuous improvement.

Creation/development of viable products, processes and systems and ensure fitness for purpose.

Appropriate application of resources, methods, tools and processes in engineering practice.

Apply appropriate quantitative science and engineering tools to the analysis of problems.

Demonstrate creative and innovative ability in synthesising solutions and in formulating designs.

Comprehend the broad picture and thus work with an appropriate level of detail.

Develop, monitor and update a plan, to reflect a changing operating environment.

Possess developed transferable skills that will be of value in a wide range of situations, including problem-solving; communication; and working with others.

Make effective use of information technology and information retrieval skills.

Plan self-learning and improve performance as the foundation for lifelong learning and continuing professional development.

Monitor and adjust a personal programme of work on an on-going basis, and learn independently.

UNIVERSITY OF CENTRAL LANCASHIRE

Programme Specification

This Programme Specification provides a concise summary of the main features of the programme and the 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.

Sources of information on the programme can be found in Section 17

13. Awarding Institution / Body	University of Central Lancashire
14. Teaching Institution and Location of Delivery	University of Central Lancashire
15. University School/Centre	School of Engineering
16. External Accreditation	Royal Aeronautical Society (RAeS) Institution of Mechanical Engineers (IMechE) *(Accreditation is currently being sought)*
17. Title of Final Award	BEng (Hons) Aerospace Engineering.
18. Modes of Attendance offered	Full Time; Sandwich
19. UCAS Code	A798 2S13
20. Relevant Subject Benchmarking Group(s)	QAA Engineering
21. Other external influences	UK Engineering Council (EC-UK) QAA Academic Infrastructure
22. Date of production/revision of this form	June 2017

23. Aims of the Programme
• Produce graduates with the knowledge, understanding and skills necessary for successful careers in aerospace engineering and for continuous professional development
• Develop the intellectual, practical and team-working skills to enable students to (a) identify, interpret and analyse engineering problems, (b) postulate, develop and assess possible solutions and (c) select, justify and deliver optimised solutions.
• Develop relevant personal skills to enable students to take responsibility for their own learning and development.
• Develop skills in the use of computing, planning and problem-solving methods, as well as the practice of effective communication.
• Provide degree courses that meet the needs of industry and satisfy the accreditation requirements of professional engineering institutions.
• (***Specific to Industrial Placement***) Produce graduates with direct experience of the practice of engineering in industry and the operation of engineering companies.

24. Learning Outcomes, Teaching, Learning and Assessment Methods

FOR INFORMATION
EC-UK learning outcomes are cross-referenced in brackets (either by category of outcomes or by individual outcomes)

A. Knowledge and Understanding

A1. Demonstrate knowledge and understanding of essential facts, concepts, theories and principles of aerospace engineering, and its underpinning science and mathematics. [*A1, US*]

A2. Appreciation of the wider multidisciplinary engineering context and its underlying principles. [*A2*]

A3. Appreciation of the social, environmental, ethical, economic and commercial considerations affecting the exercise of engineering judgement. [*A3, S*]

A4. Ability to learn new theories, concepts, methods etc. in unfamiliar situations. [*A4*]

Teaching and Learning Methods

Lectures, Seminars and Tutorials	A1, A2, A3
Active Learning	A3, A4
Practical Sessions	A1
Supervised Workshops	n/a
Project Reviews	A1, A2

Assessment methods

Written Exam	A1, A2
Coursework	A1, A2, A3
Practical Assessment	A1, A2, A3

B. Subject-specific skills

B1. Practical engineering skills (acquired through laboratories, workshops, design, etc.) and show evidence of team-working, project participation and leadership abilities. [*B1*]

B2. Systematic use of engineering analysis in order to interpret problems, assess technologies, propose solutions, implement processes and enable continuous improvement. [*E*]

B3. Creation/development of viable products, processes and systems and ensure fitness for purpose. [*D*]

B4. Appropriate application of resources, methods, tools and processes in engineering practice. [*P*]

Teaching and Learning Methods

Lectures, Seminars and Tutorials	B2, B4
Active Learning	B2
Practical Sessions	B1, B4
Supervised Workshops	B1, B3
Project Reviews	B1

Assessment methods

Written Exam	B2
Coursework	B1, B2, B3, B4
Practical Assessment	B1, B3

C. Thinking Skills

C1. Apply appropriate quantitative science and engineering tools to the analysis of problems. [*C1*]

C2. Demonstrate creative and innovative ability in synthesising solutions and in formulating designs. [*C2*]

C3. Comprehend the broad picture and thus work with an appropriate level of detail. [*C3*]

C4. Develop, monitor and update a plan, to reflect a changing operating environment. [*C4*]

Teaching and Learning Methods

Lectures, Seminars and Tutorials	C1
Active Learning	C2
Practical Sessions	C1
Supervised Workshops	n/a
Project Reviews	C3, C4

Assessment methods

Written Exam	C1
Coursework	C2, C3, C4
Practical Assessment	C1

D. Other skills relevant to employability and personal development	
D1. Possess developed transferable skills that will be of value in a wide range of situations, including problem-solving; communication; and working with others. [*D1*]	
D2. Make effective use of information technology and information retrieval skills. [*D2*]	
D3. Plan self-learning and improve performance as the foundation for lifelong learning and continuing professional development. [*D3*]	
D4. Monitor and adjust a personal programme of work on an on-going basis, and learn independently. [*D4*]	
Teaching and Learning Methods	
Lectures, Seminars and Tutorials	D1, D3, D4
Active Learning	n/a
Practical Sessions	D2
Supervised Workshops	n/a
Project Reviews	D1
Assessment methods	
Written Exam	n/a
Coursework	D3, D4
Practical Assessment	D1, D2

13. Programme Structures				14. Awards and Credits
Level	**Module Code**	**Module Title**	**Credit Rating**	
Level 6	EI 3000 EI 3010 EI 3030 EI 3040 MP3604 MP3732	Individual Project (C) Flight Dynamics and Control (COMP) Aeromechanics (COMP) Aerospace Propulsion (COMP) Advanced CAD (COMP) Operations Management B (COMP)	20 20 20 20 20 20	**BEng (Hons) Aerospace Engineering** 360 credits including 220 credits at Level 5 or above and 100 credits at Level 6 or above. **BEng Aerospace Engineering** 320 credits including 180 credits at Level 5 or above and 60 credits at Level 6 or above. Industrial placement route requires successful completion of MP2899 which has a notional credit of 120 credit.
	EI 3999	Industrial Placement (O)	120	
Level 5	EI 2010 EI 2020 EI 2910 MP2576 SC2153 MP2721	Aircraft Design and Manufacture (COMP) Systems Design and Computing (COMP) Structures and FEA (COMP) Thermofluids (COMP) Further Engineering Mathematics and Simulation (COMP) Operations Management A (COMP)	20 20 20 20 20 20	**Diploma of Higher Education** 240 credits including 100 credits at Level 5 or above.
Level 4	ER1010 ER1020 ER1030 ER1631	Engineering Analysis (COMP) Engineering Design (COMP) Engineering Science (COMP) Aerospace Vehicles (COMP)	30 30 30 30	**Certificate of Higher Education** 120 credits including 100 credits at Level 4 or above.

Note: (C) for Core, (COMP) for Compulsory and (O) for Optional

15. Personal Development Planning

Professional development is an integral part of the course and includes sessions on personal qualities, self-management, effective communication and academic assessments, as well as professional and career management.

Services are available UCLan Student Support. Students are encouraged to consider "WISER", which offers help in learning how to study more effectively and how to communicate at an advanced and professional level.

Specific guidance on engagement, influence and impact is provided for project-based modules:

EI 2010 Aircraft Design and Manufacture
EI 2020 Systems Design and Computing
EI 3000 Individual Project

This is reinforced by the personal tutorial system. Each student will be allocated to a named lecturer who will act as Personal Tutor for all years of study.

Preparation for "EI 3999 Industrial Placement" will commence at the start of the preceding year and will include advice and assistance on how to secure employment (e.g. how to complete application forms, how to write a CV and a covering letter, how to present at interview). While there are no pre-arranged placements and no guarantees of securing a placement, the programme team will offer positive support where practicable. Students who do secure an industrial placement will be allocated a Placement Tutor who will visit UK-based workplaces during that year.

16. Admissions criteria*

(including agreed tariffs for entry with advanced standing)
**Correct as at date of approval. For latest information, please consult the University's website.*

All applicants must have achieved GCSE English at Grade C or above, or an equivalent qualification.

Entry requirement for **BEng (Hons) Aerospace Engineering** is **280 points** or above:

GCE A2: BBC including Maths (Minimum B), Physics (Minimum B) and a STEM subject.
OR
BTEC Extended Diploma in Engineering: DMM including Mathematics for Engineering Technicians (Unit 4, Minimum D), Further Mathematics for Engineering Technicians (Unit 28) and Mechanical Principles and Applications (Unit 5)
OR
Equivalent qualifications

Applications will be welcomed from individuals with non-standard qualifications or relevant work experience who can demonstrate the ability to cope with and benefit from degree-level studies. Those who have not studied recently may be required to undertake a foundation programme prior to entry to Aerospace Engineering.

17. Key sources of information about the programme

- **Internal**
  http://www.uclan.ac.uk/courses/beng_aerospace_engineering.php

- **External**
  http://www.engc.org.uk/professional-qualifications/standards/uk-spec
  http://www.qaa.ac.uk/en/Publications/Documents/Subject-benchmark-statement-Engineering-.pdf
  http://www.qaa.ac.uk/publications/information-and-guidance
  http://www.aerosociety.com/Assets/Docs/Membership/AccreditationHandbook.pdf
  http://www.imeche.org/docs/default-source/tapd/acd001-annex-1-academic-accreditation-guidelines.doc?sfvrsn=4

18. Curriculum Skills Map

Level	Module Code	Module Title	Core (C), Compulsory (COMP) or Option (O)	Programme Learning Outcomes															
				Knowledge and understanding				Subject-specific Skills				Thinking Skills				Other Skills			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
LEVEL 6	EI 3000	Individual Project	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EI 3010	Flight Dynamics and Control	COMP	✓				✓	✓		✓	✓							
	EI 3030	Aeromechanics	COMP	✓					✓		✓	✓							
	EI 3040	Aerospace Propulsion	COMP	✓					✓		✓	✓							
	EI 3999	Industrial Placement	O	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	
	MP3604	Advanced CAD	COMP	✓		✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	
	MP3732	Operations Management B	COMP	✓	✓	✓			✓	✓	✓	✓	✓	✓				✓	
LEVEL 5	EI 2010	Aircraft Design and Manufacture	COMP	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓
	EI 2020	Systems Design and Computing	COMP	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓
	EI 2910	Structures and FEA	COMP																
	MP2576	Thermofluids	COMP	✓				✓	✓	✓	✓	✓	✓				✓	✓	
	SC2153	Further Engineering Math and Simul	COMP	✓				✓	✓	✓	✓		✓				✓	✓	
	MP2721	Operations Management A	COMP	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓				✓	
LEVEL 4	ER1631	Aerospace Vehicles	COMP	✓	✓				✓			✓							
	ER1020	Engineering Design	COMP	✓				✓								✓	✓	✓	
	ER1030	Engineering Science	COMP	✓	✓			✓	✓	✓		✓				✓		✓	
	ER1010	Engineering Analysis	COMP	✓					✓			✓	✓					✓	

19. LEARNING OUTCOMES FOR EXIT AWARDS:

For **each exit award available**, list learning outcomes relating to the knowledge and understanding, subject specific skills, thinking, other skills relevant to employability and personal development that a typical student might be expected to gain as a result of successfully completing each level of a course of study.

For example, for a standard BA/BSc (Hons) award the exit award learning outcomes for CertHE (Level 4) and DipHE (Level 5), BA/BSc (Level 6) should be included; for a postgraduate Masters, this would normally be PGDip and PGCert.

Learning outcomes for the award of: CertHE

Demonstrate knowledge and understanding of some of the essential facts, concepts, theories and principles of aerospace engineering, and its underpinning science and mathematics.

Appreciation of some aspects of the wider multidisciplinary engineering context and its underlying principles.

Practical engineering skills (acquired through laboratories, workshops, design, etc.) and show evidence of team-working, and project participation.

Attempt to systematic use of engineering analysis in order to interpret problems, assess technologies, propose solutions, implement processes and enable continuous improvement.

Creation/development of some aspects of viable products, processes and systems and ensure fitness for purpose.

Apply appropriate quantitative science and engineering tools to the analysis of problems.

Demonstrate some level of creative and innovative ability in synthesising solutions and in formulating designs.

Possess some transferable skills that will be of value in a wide range of situations, including problem-solving; communication; and working with others.

Make effective use of some aspects of information technology and information retrieval skills.

Plan some aspects of self-learning and improve performance as the foundation for lifelong learning and continuing professional development.

Learning outcomes for the award of: DipHE

Demonstrate knowledge and understanding of many aspects of essential facts, concepts, theories and principles of aerospace engineering, and its underpinning science and mathematics.

Appreciation of many aspects of the wider multidisciplinary engineering context and its underlying principles.

Appreciation of many aspects of the social, environmental, ethical, economic and commercial considerations affecting the exercise of engineering judgement.

Ability to learn appropriate level of new theories, concepts, methods etc. in unfamiliar situations.

Practical engineering skills (acquired through laboratories, workshops, design, etc.) and show evidence of team-working, project participation and leadership abilities.

Systematic use of engineering analysis in order to interpret problems, assess technologies, propose solutions, implement processes and enable continuous improvement.

Creation/development of many aspects of viable products, processes and systems and ensure fitness for purpose.

Appropriate application of resources, methods, tools and processes in engineering practice.

Apply appropriate quantitative science and engineering tools to the analysis of problems.

Demonstrate high level of creative and innovative ability in synthesising solutions and in formulating designs.

Comprehend the broad picture and thus work with an appropriate level of detail.

Develop, monitor and update many aspects of a plan, to reflect a changing operating environment.

Possess many transferable skills that will be of value in a wide range of situations, including problem-solving; communication; and working with others.

Make effective use of appropriate information technology and information retrieval skills.

Plan self-learning and improve performance as the foundation for lifelong learning and continuing professional development.

Monitor and adjust some aspects of a personal programme of work on an on-going basis, and learn independently.

Learning outcomes for the award of: BEng

Demonstrate knowledge and understanding of much of essential facts, concepts, theories and principles of aerospace engineering, and its underpinning science and mathematics.

Appreciation of the wider multidisciplinary engineering context and its underlying principles.

Appreciation of the social, environmental, ethical, economic and commercial considerations affecting the exercise of engineering judgement.

Ability to learn new theories, concepts, methods etc. in unfamiliar situations.

Practical engineering skills (acquired through laboratories, workshops, design, etc.) and show evidence of team-working, project participation and leadership abilities.

Systematic use of engineering analysis in order to interpret problems, assess technologies, propose solutions, implement processes and enable continuous improvement.

Creation/development of viable products, processes and systems and ensure fitness for purpose.

Appropriate application of resources, methods, tools and processes in engineering practice.

Apply appropriate quantitative science and engineering tools to the analysis of problems.

Demonstrate creative and innovative ability in synthesising solutions and in formulating designs.

Comprehend the broad picture and thus work with an appropriate level of detail.

Develop, monitor and update a plan, to reflect a changing operating environment.

Possess many transferable skills that will be of value in a wide range of situations, including problem-solving; communication; and working with others.

Make effective use of information technology and information retrieval skills.

Plan self-learning and improve performance as the foundation for lifelong learning and continuing professional development.

Monitor and adjust a personal programme of work on an on-going basis, and learn independently.

Learning outcomes for the award of: BEng (Hons)

Demonstrate knowledge and understanding of essential facts, concepts, theories and principles of aerospace engineering, and its underpinning science and mathematics.

Consider and apply wider multidisciplinary engineering context and its underlying principles into practice.

Appreciation of the social, environmental, ethical, economic and commercial considerations affecting the exercise of engineering judgement.

Ability to learn and apply new theories, concepts, methods etc. in unfamiliar situations.

Practical engineering skills (acquired through laboratories, workshops, design, etc.) and show evidence of team-working, project participation and leadership abilities.

Systematic use of engineering analysis in order to interpret problems, assess technologies, propose solutions, implement processes and enable continuous improvement.

Creation/development of viable products, processes and systems and ensure fitness for purpose.

Appropriate application of resources, methods, tools and processes in engineering practice.

Apply appropriate quantitative science and engineering tools to the analysis of problems.

Demonstrate creative and innovative ability in synthesising solutions and in formulating designs.

Comprehend the broad picture and thus work with an appropriate level of detail.

Develop, monitor and update a plan, to reflect a changing operating environment.

Possess developed transferable skills that will be of value in a wide range of situations, including problem-solving; communication; and working with others.

Make effective use of information technology and information retrieval skills.

Plan self-learning and improve performance as the foundation for lifelong learning and continuing professional development.

Monitor and adjust a personal programme of work on an on-going basis, and learn independently.

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Programme Specification

1. Awarding Institution / Body	University of Central Lancashire
2. Teaching Institution and Location of Delivery	University of Central Lancashire Preston campus
3. University School	School of Engineering
4. External Accreditation	N/A
5. Title of Final Award	MEng (Hons) / BEng (Hons) / BSc (Hons) Engineering (Foundation Entry) (non-award bearing programme: initial stage of 5-year (MEng) or 4-year (BEng / BSc) degree course)
6. Modes of Attendance offered	Full-time / Part-Time *Note that part-time attendance mode is not guaranteed to be one day per week.*
7. UCAS Code	TBD
8. Relevant Subject Benchmarking Group(s)	QAA Subject Benchmarking Statements: Engineering (2015), and Construction, Property & Surveying (2008). *Note that the QAA SBSs mainly focus on Bachelor's degree with honours level and Master's level, and so are informative rather than directly applicable to this Foundation Year Entry course.*
9. Other external influences	Engineering Council UK-SPEC QAA
10. Date of production/revision of this form	4 May 2016
11. Aims of the Programme	
• **To equip the student with a broad range of subject-specific and transferable skills that will enable progression to a range of undergraduate honours programmes (BSc / BEng / MEng) within the School of Engineering, most of which lead to awards with Professional Accreditation.**	
• **To enable the student to gain confidence as an independent learner and the ability to reflect on their own range of skills and knowledge.**	

- **To encourage the student to identify and pursue further learning opportunities and / or employment.**
- **To encourage the student to develop an awareness of the role of the engineer, and other related professions, in industry.**

12. Learning Outcomes and Teaching, Learning and Assessment Methods

A. Knowledge and Understanding

On successful completion of the programme the students will be able to:

A1. Demonstrate the skills necessary to undertake undergraduate degree level study in areas covered by the School of Engineering, including basic ICT skills and mathematics.

A2. Explain and apply the basic principles relevant to a range of areas covered in courses within the School of Engineering.

A3. Discuss the external factors impacting various areas covered in courses within the School of Engineering.

Teaching and Learning Methods

A range of teaching and learning methods will be used such as lectures, tutorials, workshops, discussions, feedback sessions, practical sessions, design exercises and simulations, including use of ICT and online materials (via elearn / Blackboard).

Assessment Methods

A range of assessment methods will be used such as portfolios, examinations, practical exercises and team-work exercises. Formative assessment will include peer/self-evaluation and on-line evaluation.

B. Subject-Specific Skills

On successful completion of the programme the students will be able to:

B1. Demonstrate a logical approach to problem solving, design and analysis.

B2. Communicate effectively through written, graphical and oral presentations.

B3. Demonstrate basic competence in academic research methods including use of ICT and electronic resources.

Teaching and Learning Methods

A range of teaching and learning methods will be used such as lectures, tutorials, workshops, discussions, feedback sessions, practical sessions, design exercises and simulations, including use of ICT and online materials (via elearn / Blackboard).

Assessment Methods

A range of assessment methods will be used such as portfolios, examinations, practical exercises and team-work exercises. Formative assessment will include presentations, peer/self-evaluation and on-line evaluation.

C. Thinking Skills

On successful completion of the programme the students will be able to:

C1. Demonstrate effective decision-making in the context of understanding and solving problems related to areas covered in courses within the School of Engineering.

C2. Recognise and apply appropriate techniques to develop solutions to real-world problems.

C3. Reflect on their own understanding and begin to develop critical judgements.

Teaching and Learning Methods

A range of teaching and learning methods will be used such as lectures, tutorials, workshops, discussions, feedback sessions, practical sessions, design exercises and simulations, including use of ICT and online materials (via elearn / Blackboard).

Assessment Methods

A range of assessment methods will be used such as portfolios, examinations, practical exercises and team-work exercises. Formative assessment will include presentations, peer/self-evaluation and on-line evaluation.

D. Other skills relevant to employability and personal development

On successful completion of the programme the students will be able to:
D1. Work independently and manage time effectively.
D2. Demonstrate effective communication using reports and presentations.
D3. Demonstrate effective ICT skills.

Teaching and Learning Methods

A range of teaching and learning methods will be used such as lectures, tutorials, workshops, discussions and feedback sessions, including use of ICT and online materials (via elearn / Blackboard).

Assessment Methods

A range of assessment methods will be used such as portfolios and team-work exercises. Formative assessment will include presentations, peer/self-evaluation and on-line evaluation.

13. Programme Structure

Level	Module Code	Module Title	Credit rating
3	ERC001	Study Skills	20
	ERC002	Basic Mathematics	20
	ERC003	Information and Communications Technology	20
	ERC004	Practical Skills	20
	ERC005	Design Studies	20
	ERC006	Analytical Studies	20

14. Awards and Credits

BSc (Hons) / BEng (Hons) / MEng (Hons) Engineering (Foundation Entry) Requires completion of 120 credits at Level 3.

Successful completion of the six Foundation Year Entry modules at the appropriate performance level (see below) leads to progression to Year 1 of appropriate undergraduate programmes within the School of Engineering.

An average mark of 60% or above is required for progression to MEng (Hons) courses.
MEng (Hons) Aerospace Engineering
MEng (Hons) Computer Aided Engineering
MEng (Hons) Civil Engineering
MEng (Hons) Electronic Engineering
MEng (Hons) Energy Engineering
MEng (Hons) Fire Engineering
MEng (Hons) Mechanical Engineering
MEng (Hons) Motor Sports Engineering
MEng (Hons) Oil and Gas Safety Engineering
MEng (Hons) Robotics Engineering

				An average mark of 50% or above is required for progression to **BEng (Hons) Aerospace Engineering** **BEng (Hons) Computer Aided Engineering** **BEng (Hons) Civil Engineering** **BEng (Hons) Electronic Engineering** **BEng (Hons) Energy Engineering** **BEng (Hons) Fire Engineering** **BEng (Hons) Mechanical Engineering** **BEng (Hons) Mechanical Maintenance Engineering** **BEng (Hons) Motor Sports Engineering** **BEng (Hons) Oil and Gas Safety Engineering** **BEng (Hons) Robotics Engineering** **BEng (Hons) Building Services and Sustainable Engineering** **An average mark of 40% or above is required for progression to** **BSc (Hons) Building Surveying** **BSc (Hons) Construction Project Management** **BSc (Hons) Facilities Management** **BSc (Hons) Quantity Surveying** **BSc (Hons) Fire and Leadership Studies** **BSc (Hons) Fire Safety and Risk Management** **Details of the delivery and focus of some of the modules would depend on the specific programme the student is registered for. Progression to School of Engineering programmes other than the programme for which the student is registered may be subject to interview.**

15. Personal Development Planning

PDP-related learning is presented informally at induction and is supported in all six modules in various respects. Students will be expected to develop a portfolio of their work throughout the year (coursework, reports, completed example sheets etc.), and discuss aspects of their personal and professional development with members of the course team including their Academic Advisor.

16. Admissions Criteria

Standard entrants will require 200 points at A-level (from two A-level passes), or 160 points (MPP) at BTEC, or equivalent. GCSE-level Mathematics and English at grade C or above are required. There are no other mandatory formal educational or specialist knowledge requirements for admission to this Foundation Year Entry programme.

Non-standard entrants will be considered on an individual basis, normally through interview, and are expected to be able to demonstrate personal reflection on their career to-date and show a strong desire and ability to study. They may be asked to produce a piece of written work to help assess their ability to benefit from the programme.

International applicants will have to demonstrate that they will benefit from the course and that they have a good grasp of the English language: English should be at the standard IELTS level required (or equivalent) by the University for admission to a Foundation Year

Entry course at level 3, i.e. an overall IELTS score of 6.0 or higher with no subscore below 5.5.
17. Key sources of information about the programme
• UCLan web pages and prospectus.
• UCAS website
• Other UCLan marketing activities, e.g. Open Days etc.

18. Curriculum Skills Map

Level	Module Code	Module Title	Core (C), Compulsory (Comp)	Knowledge and Understanding			Subject-Specific Skills			Thinking Skills			Other skills relevant to employability and personal development		
				A1	A2	A3	B1	B2	B3	C1	C2	C3	D1	D2	D3
Level 3	ERC001	Study Skills	Comp	X	X	X	X	X	X			X	X	X	X
	ERC002	Basic Mathematics	Comp	X	X	X	X	X		X	X	X	X		
	ERC003	ICT	Comp	X	X		X	X	X	X	X	X	X	X	X
	ERC004	Practical Skills	Comp	X	X	X	X	X	X	X	X	X	X	X	X
	ERC005	Design Studies	Comp	X	X	X	X	X	X	X	X	X	X	X	X
	ERC006	Analytical Studies	Comp	X	X	X	X	X	X	X	X	X	X	X	X