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

All course materials, including lecture notes and other additional materials related to your course and provided to you, whether electronically or in hard copy, as part of your study, are the property of (or licensed to) UCLan and MUST not be distributed, sold, published, made available to others or copied other than for your personal study use unless you have gained written permission to do so from the Dean of School. This applies to the materials in their entirety and to any part of the materials.
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1 Welcome to the Course
2 Structure of the Course
3 Approaches to teaching and learning
4 Student Support
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  8.1 Programme Specification(s)
1. Welcome to the course

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

Matthew Dickinson – Course Leader for MEng/BEng (Hons) Computer Aided Engineering.

1.1 Rationale, aims and learning outcomes of the course

The course is intended to provide the opportunity to gain a degree and additional valuable experience to enable graduates to have a good chance of entering the engineering industry. It has been developed as a direct result of the need for professionals within the engineering industry and satisfies the requirements of an Engineering Council Institution.

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: BEng/MEng (Honours) Computer Aided Engineering with Industrial Placement.

The aims of the courses are:-

**BEng**

- To attract able and motivated students of high-calibre, both from within UK and overseas and equip them with a thorough understanding of computer aided engineering principles and practices.
- To provide students with skills to systematically apply those engineering principles to solve complex and unpredictable real-world engineering problems.
- To develop the skills of:
  - communications e.g. report writing, giving presentations use of information technology and appropriate computer-based tools
  - numeracy, e.g. mathematical analysis, graphical methods for representing experimental data
  - problem solving e.g. develop the ability to analyse a particular problem
  - individual study skills e.g. time management, planning, use of different information sources etc.
- To develop professional mechanical engineering graduates with industry relevant personal and professional skills and attributes.
- To provide the educational base for future progression onto Chartered Engineer status.

**MEng**

- To attract able and motivated students of high-calibre, both from within UK and overseas and equip them with a thorough understanding of computer aided engineering principles and practices.
• To provide students with an in-depth understanding of some specialised areas within computer aided engineering, through individual and team-based projects, usually in industrial environment.

• To develop the skills of:
  - communications e.g. report writing, giving presentations use of information technology and appropriate computer-based tools
  - numeracy, e.g. mathematical analysis, graphical methods for representing experimental data
  - problem solving e.g. develop the ability to analyse a particular problem
  - individual study skills e.g. time management, planning, use of different information sources etc. working with others

• To prepare students for professional careers in computer aided engineering those of which require high levels of judgement, leadership, initiative, delegation and decision-making responsibilities.

• To fulfil educational requirements for future progression onto Chartered Engineer status.

Please refer to the full program specifications, including learning outcomes. These are provided separately.

1.2 Course Team

<table>
<thead>
<tr>
<th>Staff</th>
<th>Room</th>
<th>Telephone</th>
<th>e-mail address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Justin Whitty</td>
<td>CM127</td>
<td>01772-893274</td>
<td><a href="mailto:J.Whitty@uclan.ac.uk">J.Whitty@uclan.ac.uk</a></td>
</tr>
<tr>
<td>Ian Sherrington</td>
<td>CM110</td>
<td>01772-893322</td>
<td><a href="mailto:ISherrington@uclan.ac.uk">ISherrington@uclan.ac.uk</a></td>
</tr>
<tr>
<td>Joel Allison</td>
<td>CM131</td>
<td>01772-893252</td>
<td><a href="mailto:J.Allison@uclan.ac.uk">J.Allison@uclan.ac.uk</a></td>
</tr>
<tr>
<td>Matt Dickinson</td>
<td>CM123</td>
<td>01772-893261</td>
<td><a href="mailto:MDickinson1@uclan.ac.uk">MDickinson1@uclan.ac.uk</a></td>
</tr>
<tr>
<td>Graham Calderbank</td>
<td>CM028</td>
<td>01772-893318</td>
<td><a href="mailto:GJ.Calderbank@uclan.ac.uk">GJ.Calderbank@uclan.ac.uk</a></td>
</tr>
<tr>
<td>Tony Broad</td>
<td>CM123/WB4</td>
<td>01772-893358</td>
<td><a href="mailto:ABroad@uclan.ac.uk">ABroad@uclan.ac.uk</a></td>
</tr>
<tr>
<td>Patrick Ryan</td>
<td>CM109</td>
<td>01772-893273</td>
<td><a href="mailto:PRyan1@uclan.ac.uk">PRyan1@uclan.ac.uk</a></td>
</tr>
</tbody>
</table>

1.3 Expertise of staff

Ian Sherrington is Professor of Tribotechnology and Director of the Jost Institute. He has been awarded several prizes for his contribution in tribology (Thomas Stephen Tribology Group prize, Tribology Bronze Medal). His responsibilities include serving as a member of the I.Mech.E Tribology Group Committee, membership of the editorial panel for the journal “Engineering Tribology”, acting as meetings secretary for the International Tribology Council (ITC) and serving as editor for their newsletter.

Joel Allison re-joined the University of Central Lancashire as a Lecturer in Engineering in
2013. Joel graduated from the University in 2004 with a BEng (Hons.) in Motorsports Engineering. Since graduating he has been involved in the design and engineering of a number of world leading sports and racing cars. Joel has experience in a range of areas including Computer Aided Design, Composites and full vehicle design in motorsport and low volume road cars.

Matthew Dickinson has been a lecturer in computer aided engineering at the University of Central Lancashire since September 2008. He is research active within the area of Tribotechnology, focussing around the piston assembly and is a member of the Jost Institute. As a student Matthew was nominated for the Malcolm Faulkner Student Prize for Sustainable Futures. Matthew is also the winner of the 2007 Autodesk community world design competition.

Graham has been an engineering lecturer at the University of Central Lancashire since November 2008. He is research active within the area of tribotechnology and during his time at the University he has become a member of the Jost Institute. Graham is now involved in research relating to the lubrication of marine diesel engines. As a student, he graduated from Imperial College and specialises in dynamics (fluid /thermo /mechanical).

Tony Broad is a senior Lecturer in Engineering and skilled Mechanical Engineer with extensive industrial and teaching experience. Expertise in a range of engineering subject areas. Currently lecturing on Computer Aided, Motorsport and Mechanical Technology Degrees. Course Leader for Computer Aided Engineering. Currently research active on small wind turbine blade design and manufacturing technology leading to MSc by Research. Project supervisor for BEng and MEng Degree students.

Patrick Ryan has been a lecturer in engineering and computing at the University of Central Lancashire since September 2006. During his time at the University he has taught and supported a wide range of course modules across engineering and computing. Prior to joining UCLan he taught for five years in secondary education and spent many years in industry leading a diverse range of IT and telecommunications projects.

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
eemail: FosterHub@uclan.ac.uk

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

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

Brook Building
Community, Health and Midwifery
Nursing
Health Sciences
Social Work, Care and Community telephone:
01772 891992/891993
eemail: 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.

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. If you wish to make contact with your External Examiner, you should do this
through your Course Leader and not directly. External Examiner reports will be made available to you electronically. The School will also send a sample of student coursework to the external examiner(s) for external moderation purposes, once it has been marked and internally moderated by the course tutors. The sample will include work awarded the highest and lowest marks and awarded marks in the middle range.

The particular individuals associated with these courses, are:
Abi Summerfield (MPhil, BEng, PGCE), Senior Lecturer, University of Wales, UK

2. Structure of the course
2.1 Overall structure

A Foundation Entry year is available for this course, please refer to the programme specification in the appendix of this handbook for further information on the modules for study.

The course exists as part of the Modular Credit Accumulation and Transfer Scheme (MODCATS). The award requires that the student passes 360 credits for BEng (Hons), or 480 credits for MEng (Hons). Students wishing to follow part time study are counselled by a member of staff and a suitable programme of study developed

The full list of options indicated may not all be delivered every year, and this may depend on how many students choose that particular option. When accepting your offer of a place to study on this course, you are accepting that not all of these options will be running. At (or before) the start of each year, you will have an opportunity to discuss your course and preferred options with your tutor. The University will do all it reasonably can to ensure that you are able to undertake your preferred options.

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.

**Level 4 Modules**

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Module Title</th>
<th>Credit</th>
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</thead>
<tbody>
<tr>
<td>ER1020</td>
<td>Engineering Design</td>
<td>30</td>
</tr>
<tr>
<td>ER1030</td>
<td>Engineering Science</td>
<td>30</td>
</tr>
<tr>
<td>ER1010</td>
<td>Engineering Analysis</td>
<td>30</td>
</tr>
<tr>
<td>ER1630</td>
<td>Engineering Applications</td>
<td>30</td>
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**Level 5 Modules**

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<thead>
<tr>
<th>Module Code</th>
<th>Module Title</th>
<th>Credit</th>
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</thead>
<tbody>
<tr>
<td>MP2899</td>
<td>Industrial Placement (O)</td>
<td>120</td>
</tr>
<tr>
<td>Either</td>
<td>Further Eng Math &amp; Simulation</td>
<td>20</td>
</tr>
<tr>
<td>SC2153</td>
<td>CAD &amp; simulation</td>
<td></td>
</tr>
<tr>
<td>MP2715</td>
<td>Engineering Design &amp; Manufacture</td>
<td>40</td>
</tr>
<tr>
<td>MP2576</td>
<td>Thermo-fluids</td>
<td>20</td>
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### Level 5 Modules

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MP2721</td>
<td>Operations Management A</td>
<td>20</td>
</tr>
<tr>
<td>Either</td>
<td>Dynamic Modelling of Engineering Sys (O)</td>
<td>20</td>
</tr>
<tr>
<td>Or</td>
<td>Instrumentation &amp; Control (O)</td>
<td>20</td>
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### Level 6 Modules (BEng only)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MP3604</td>
<td>Advanced Computer Aided Design</td>
<td>20</td>
</tr>
<tr>
<td>MP3678</td>
<td>Principles of Engg Simulation</td>
<td>10</td>
</tr>
<tr>
<td>MP3997</td>
<td>Project (C for BEng(Hons))</td>
<td>30</td>
</tr>
<tr>
<td>MP3732</td>
<td>Operations Management B</td>
<td>20</td>
</tr>
<tr>
<td>MP3610</td>
<td>Automated Production B (O)</td>
<td>20</td>
</tr>
<tr>
<td>MP3774</td>
<td>Computer Aided Tribology (O)</td>
<td>20</td>
</tr>
</tbody>
</table>

### Level 6 Modules (MEng only)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP3604</td>
<td>Advanced Computer Aided Design</td>
<td>20</td>
</tr>
<tr>
<td>MP3672</td>
<td>Engineering Simulation</td>
<td>20</td>
</tr>
<tr>
<td>MP3995</td>
<td>Project (C for BEng(Hons))</td>
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</tr>
<tr>
<td>MP3732</td>
<td>Operations Management B</td>
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#### Option modules (two of the following)

<table>
<thead>
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<tbody>
<tr>
<td>MP3610</td>
<td>Automated Production B (O)</td>
<td>20</td>
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<tr>
<td>Either</td>
<td>Mod &amp; Control of Dynamic Sys (O)</td>
<td>20</td>
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<tr>
<td>or</td>
<td>Control Systems(O)</td>
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### Level 7 Modules

<table>
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</thead>
<tbody>
<tr>
<td>MP4580</td>
<td>The Engineer and Society</td>
<td>20</td>
</tr>
<tr>
<td>ER4587</td>
<td>Group Project (C)</td>
<td>20</td>
</tr>
<tr>
<td>MP4582</td>
<td>Advanced Tribology</td>
<td>20</td>
</tr>
<tr>
<td>MP4583</td>
<td>Advanced Engineering Systems</td>
<td>20</td>
</tr>
<tr>
<td>ER4995</td>
<td>Project (C)</td>
<td>20</td>
</tr>
<tr>
<td>Either</td>
<td>Advanced Computer Aided Engineering</td>
<td>20</td>
</tr>
<tr>
<td>Or</td>
<td>Advanced Mechatronics Systems</td>
<td>20</td>
</tr>
</tbody>
</table>
2.3 Course requirements

MEng (Hons) Computer Aided Engineering requires 480 credits with a minimum of 360 at level 5 or above, 200 at level 6 or above, 100 at level 7.

MEng (Hons) Computer Aided Engineering with Industrial Placement requires 480 credits with a minimum of 360 at level 5 or above, 200 at level 6 or above, 100 at level 7, plus satisfactory completion of the Placement module MP2899.

BEng (Hons) Computer Aided Engineering requires 360 credits including a minimum of 220 at level 5 or above and a minimum of 100 at level 6.

BEng (Hons) Computer Aided Engineering with Industrial Placement requires 360 credits including a minimum of 220 at level 5 or above and a minimum of 100 at level 6, plus satisfactory completion of the Placement module MP2899.

Both BEng and MEng Mechanical Engineering courses are conditionally approved for accreditation with Institution of Mechanical Engineers (IMechE) Institution of Engineering Designers (IED) as follows: BEng Computer Aided Engineering partially meets education requirement for Chartered Engineer status (CEng) and MEng Computer Aided Engineering fully meets education requirement for Chartered Engineer status (CEng).

As a student undertaking this course, you are bound by the Code of Conduct as specified by Institution of Mechanical Engineers (IMechE) Institution of Engineering Designers (IED) and subject to the UCLan procedure for the consideration of Fitness to Practise.

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

Your weekly timetable can be found https://www.uclan.ac.uk/students/study/timetabling.php

2.5.2 Expected hours of study

20 credits is a standard module size and equals 200 notional learning hours.

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 translates to a total of 6 hours per 20 credit module per week, 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).
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 to:

– CandTHubAttendance@uclan.ac.uk or by telephoning the hub on 01772 891994 or 01772 891995.

Un-authorised absence is not acceptable and may attract academic penalties and/or other penalties. If you have not gained the required authorisation for leave of absence, do not respond to communications from the University and if you are absent for four weeks or more, you may be deemed to have withdrawn from the course. If this is the case, then the date of withdrawal will be recorded as the last day of attendance. For students from outside the EU the UK Border Agency will be notified you have nonattendance without good cause or withdraw from the course. Your attendance for each module is recorded and monitored using the SAM system, which allows you to check your record of attendance at any time through myUCLan. If you find there is an error with your attendance record, please inform your module tutor. Each time you are asked to enter your details on SAM you must remember that the University has a responsibility to keep information up to date and that you must only enter your own details on the system. To enter any other names would result in inaccurate records and be dishonest. Any student who is found to make false entries can be disciplined under the student guide to regulations.

3. Approaches to teaching and learning

3.1 Learning and teaching methods

The University has a wide range of learning methods that you will be expected to pursue. The module leaders will make it clear when and where you are expected to access these resources. See 3.3 below. Help yourself by starting assignments and learning activities on day 1. You are expected to demonstrate initiative and be pro-active in your learning. The courses are delivered in the context of the Product Cycle to achieve the broad experiences needed for successful progression into engineering and enterprise on graduation.

During Stage 1 you will your experiences will help you to develop the competences later in the course. You will have the opportunity to develop competences with extra-curricular activities. The experience develops knowledge and skills across a wide range of activities that are all important within engineering.

During Stage 2 you will develop competences with individual and group activities based around the product cycle. You will need to analyse and evaluate the context and relevance of these activities.

An Industrial Placement is the most straightforward way to improve your employability. It is this combined with the rest of the course that has resulted in the success reputation of employability.

For MEng students stage 3 requires that ‘optimal’ solutions are included in the developments along with the aspects around the product cycle as in stage 2.

3.2 Study skills

To develop the skills of communications e.g. report writing, giving presentations, use of information technology and appropriate computer-based tools, numeracy, e.g. mathematical analysis, graphical methods for representing experimental data, problem solving e.g. develop the ability to analyse a particular problem, Individual study skills e.g. time management, planning, use of different information sources etc.
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.

3.3.2 Electronic Resources

LIS provide access to a huge range of electronic resources – e-journals and databases, e-books, images and texts.

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

Your future is important to us, so to make sure that you achieve your full potential whilst at university and beyond, your course has been designed with employability learning integrated into it. This is not extra to your degree, but an important part of it which will help you to show future employers just how valuable your degree is. These “Employability Essentials” take you on a journey of development that will help you to write your own personal story of your time at university:

- To begin with, you will explore your identity, your likes and dislikes, the things that are important to you and what you want to get out of life.
- Later, you will investigate a range of options including jobs and work experience, postgraduate study and self-employment,
- You will then be ready to learn how to successfully tackle the recruitment process.

It’s your future: take charge of it!

Career services offers a range of support for you including:

- career and employability advice and guidance appointments
- support to find work placements, internships, voluntary opportunities, part-time employment and live projects
- workshops, seminars, modules, certificates and events to develop your skills
4. Student Support
The following section outlines any course specific support that is available whilst studying at UCLan.

4.1 Academic Advisors
Academic Advisers provide help for students with problems and are responsible for overseeing the progress of students, their welfare, academic counselling and guidance. Your Academic Adviser is allocated when you enrol. You must see your Academic Adviser when requested and meet at least once per semester. Ensure they know you and have your current email address.

Please seek help relating to lecture material and practical classes from the module tutor in the first instance. If necessary make an appointment to seek additional support. Please remember that academic staff are busy people and may not be able to give you instant help. Although Academic Advisers and Course Leaders will deal with most of the day-to-day questions which arise, the Head of School is always willing to see students and an appointment can be made through the Student Hub. Advice relating to administrative issues may be obtained from the Student Hub.

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.

Assessment arrangements for students with a disability
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

The School of Engineering Disability Tutor is: Dr J. Yazdani, Email: JYazdani@uclan.ac.uk
4.3 Students’ Union
The Students’ Union offers thousands of volunteering opportunities ranging from representative to other leadership roles. We also advertise paid work and employ student staff on a variety of roles. You can find out more information on our website:
http://www.uclansu.co.uk/

5. Assessment

5.1 Assessment Strategy
The assessment strategy for each module will be outlined within the module. The modules will be assessed either as coursework or by a combination of coursework and examinations with the weightings reflecting the course content (theory/practical). Each of the assessments that you complete will assess a series of learning outcomes defined in the modules. Note that within some modules you may complete assessments that do not carry marks, these are termed formative and are an opportunity for you to gain feedback on your progress that will help you in your summative (mark carrying) assessments.

5.2 Notification of assignments and examination arrangements
You will be notified of assessments by your module tutors. They will advise you of what is required, and of the respective submission dates or exam arrangements, during one or more of the timetabled sessions. In general the examination arrangements are available from the University web site. These arrangements are not generally made by the module tutors. Assignments and coursework should be submitted to the assignment boxes located on the ground floor of School Of Computing, Engineering & Physical Sciences Building or through module access on the Blackboard system. Each assignment must have a signed ‘Assignment Submission Form’ attached unless digital.

5.3 Referencing
For most of your assignments you will be expected to do some further reading, and you are required to think and produce increasingly original work around the work of others. Do not fall into the ‘plagiarism trap’ either deliberately or by accident. You need to give suitable credit to those that have produced the work that you are using. You should reference any information you have refer to in your assignment using the Harvard referencing system. You find information on the Harvard referencing system on the internet (google ‘Harvard Referencing’).

5.4 Confidential material
In the cases where Engineering students might use confidential information you should take guidance from your module tutor on your ethical and legal responsibilities to respect confidentiality and maintain anonymity of individuals within their assignments. In the case where you complete a dissertation or project that contains sensitive information it is important that you complete the assignment within the deadlines. Your assessment (presentation, report etc) should deal with the confidential information in a manner that allows you to complete the assessment within the specified deadlines.

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 pseudoTurnitin 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.

5.6 How do I know that my assessed work had been marked fairly?
Assessment is an integral part of the course. Module staff work closely together to design assessments, agree the marking criteria and approve final versions of assessments to ensure that these are appropriate. The criteria for assessment will be communicated to you clearly during the module teaching.

All module staff engage in development and training in assessment, marking and feedback. Once the assessments have been completed the module team will discuss the assessment methods and marking criteria, prior to starting to mark, so that there is a common understanding of what is expected of students. All assessed modules have moderation built into the marking process. Moderation involves sampling students’ assessed work to make sure that the learning outcomes and agreed marking criteria have been interpreted and applied in the same way. This ensures that you and your fellow students are treated equitably and that the academic standards are applied consistently. During the marking process the module leader will co-ordinate moderation to ensure that at least 10% of assessed work (or a minimum of three pieces) has been reviewed by other markers and any concerns about consistency or accuracy addressed with the whole module team. Your work may or may not be part of this sample, but the processes for developing assessments and marking criteria as well as moderation mean that you can be confident that teaching staff are marking assessments to the same criteria. Module teams may then use feedback from moderation to improve clarity about the nature and purpose of future assessment, or to make changes if required.

Modules are also moderated externally. The module leader will arrange for the external examiner to receive a sample of work for review and comment. External examiners cannot change individual grades, but can act as ‘critical friends’ and confirm that marking standards are in line with other, similar courses in the sector. If, on reviewing the sample, external examiners feel that the marking criteria have not been applied consistently the work of the whole cohort will be reviewed.

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.

**BEng:** for Undergraduate Honours Degrees the APM is based on a weighted average of all your Level 5 and Level 6 modules. Higher level study is recognised through weightings applied in the ratio 3:7 for Level 5: Level 6.

**MEng:** for Integrated Masters Degrees the APM is based on a weighted average of all Level 5, 6 and 7 modules. Weightings are applied in the ratio 2:3:4 for Level 5: Level 6: Level 7. In the case of Undergraduate Honours Degrees, where the APM is near a borderline, at the discretion of the Assessment Board, students may be classified according to the academic judgement of the Assessment Board taking into account their overall profile and performance with the minimum requirement that:
1. At least 6 modules (120 credits) at either level 5 or 6 are in the higher classification band (or above)
2. A minimum of 3 modules (60 credits) at level 6 are in the higher classification band (or above)
3. The APM is no lower than 2 percentage points below that required for the higher classification.

In operating discretion for profiling Course Assessment Boards will use academic judgement and will refer to performance in core modules, the placement component, the major project or other factors which will be published to students in advance. Profiling is only applicable to Undergraduate Honours Degrees, i.e. does not apply to the Integrated Masters Degrees.

7. Student Feedback
You can play an important part in the process of improving the quality of this course through the feedback you give.

You can play an important part in the process of improving the quality of this course through the feedback you give. In addition to the ongoing discussion with the course team throughout the year, there are a range of mechanisms for you to feedback about your experience of teaching and learning. We aim to respond to your feedback and let you know of our plans for improvement. One of the influences in the title and content of modules has been due to student feedback both directly and through MEQs (module evaluation questionnaires). The stimulus to have the courses accredited began with a lobby of a small number of students during the 2005-2006 session.

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.
The purpose of a SSLC meeting is to provide the opportunity for course representatives to feedback to staff about the course, the overall student experience and to inform developments which will improve future courses. These meetings are normally scheduled once per semester. Meetings will be facilitated using guidelines and a record of the meeting will be provided with any decisions and / or responses made and / or actions taken as a result of the discussions held. The meetings include discussion of items forwarded by course representatives, normally related to the following agenda items (dependent on time of year).
The course team encourage student feedback in all areas and recognise that additional items for discussion may also be raised at the meeting.

Update on actions completed since the last meeting
• Feedback about the previous year – discussion of external examiner’s report; outcomes of National /UCLan student surveys.
• Review of enrolment / induction experience;
• Course organisation and management (from each individual year group, and the course overall);
• Experience of modules - teaching, assessment, feedback;
• Experience of academic support which may include e.g. Personal Development Planning, academic advisor arrangements;
• Other aspects of University life relevant to student experience e.g. learning resources, IT, library;
• Any other issues raised by students or staff.
### 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

<table>
<thead>
<tr>
<th>1. Awarding Institution / Body</th>
<th>University of Central Lancashire</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Teaching Institution</td>
<td>University of Central Lancashire</td>
</tr>
<tr>
<td></td>
<td>European University in Egypt (EUE) (foundation year only)</td>
</tr>
<tr>
<td>3. University Department/Centre</td>
<td>School of Engineering</td>
</tr>
<tr>
<td>4. External Accreditation</td>
<td>Institution of Engineering Designers (IED) (Preston Campus only)</td>
</tr>
<tr>
<td></td>
<td>Institution of Mechanical Engineers (IMechE) (Preston Campus only)</td>
</tr>
<tr>
<td>5. Title of Final Award</td>
<td>BEng(Hons) Computer Aided Engineering</td>
</tr>
<tr>
<td>6. Modes of Attendance offered</td>
<td>Full-time, Sandwich and Part-time.</td>
</tr>
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<td>7. UCAS Code</td>
<td>H132</td>
</tr>
<tr>
<td>7b JACS/HECOS Codes</td>
<td>H130/100160</td>
</tr>
<tr>
<td>8. Subject Benchmarking Group</td>
<td>QAA Engineering</td>
</tr>
<tr>
<td>9. Other external influences</td>
<td>Engineering Council, Engineering Institutions</td>
</tr>
<tr>
<td>10. Date of production/revision of this form</td>
<td>July 2019</td>
</tr>
</tbody>
</table>

### 11. Aims of the Programme

- To attract able and motivated students of high-calibre, both from within UK and overseas and equip them with a thorough understanding of computer aided engineering principles and practices.
- To provide students with skills to systematically apply those engineering principles to solve complex and unpredictable real-world engineering problems.
- To develop the skills of:
  - communications e.g. report writing, giving presentations
  - use of information technology and appropriate computer-based tools
  - numeracy, e.g. mathematical analysis, graphical methods for representing experimental data
problem solving e.g. develop the ability to analyse a particular problem
individual study skills e.g. time management, planning, use of different information sources etc.

- To develop professional mechanical engineering graduates with industry relevant personal and professional skills and attributes.
- To provide the educational base for future progression onto Chartered Engineer status.

12. Learning Outcomes, Teaching, Learning and Assessment Methods

The Engineering Council sets the overall requirements for the Accreditation of Higher Education Programmes (AHEP) in engineering, in line with the UK Standard for Professional Engineering Competence (UK-SPEC). AHEP sets the learning outcome for accredited degree programmes in five categories: Science and Mathematics (SM); Engineering Analysis (EA); Design (D); Economic, Legal, Social, Ethical and Environmental Context (ET); Engineering Practice (EP). The latest edition of AHEP can be found at this link: http://www.engc.org.uk/ahep

The following sections A, B, C, and D are written in the UCLan format, referring to the corresponding learning outcomes in AHEP (for partial CEng). Postfix ‘p’ Indicates that the learning outcome is for partial CEng accreditation.

A. Knowledge and Understanding

Knowledge and understanding both of the overall features, limitations and principles, and also of in-depth aspects of

A1. computer aided engineering (SM1p, EA4p)
A2. systems simulation (SM2p, EA1p, EA2p, EA3p)
A3. operations management (ET1p, ET2p, ET3p)
A4. the role of engineering in an industrial and commercial context (ET4p, ET5p, ET6p)
A5. engineering science (SM1p, SM2p, SM3p)

Teaching and Learning Methods

Stage 1 includes lectures, seminars, individual assignments with a small number of group assignments. A number of hours per week is spent in the student workshops to develop a direct experience of manufacturing processes. Use is made of specialist equipment within School of Engineering to introduce engineering principles.

Stage 2 ~ Level 5 includes individual and team assignments and projects of increasing complexity normally involving the use of relevant software packages and for manufacturing, use of the specialist equipment within engineering, to further develop competences associated with designing for manufacture in an effective manner and to provide knowledge, understanding and a belief in the relationships between the shape, materials properties and loads on components and systems.

Stage 2 ~ Level 6 includes the development of engineering skills associated with projects engineering in a supportive manner such that the student is required to develop and assess the key skills associated with projects engineering namely scheduling, resources and time management, independent learning, communications and an effective and meaningful use of software. In addition students are develop valuable skills associated operations management and manufacturing systems.

Assessment methods

Stage 1 includes workbooks, reports, oral presentations, small assignments and four formal examinations.

Stage 2 includes reports, group work, individual working, designing, manufacturing, viva voce, portfolios and associated commentaries, major project research and decomposition, planning, assessing individual and group profiles and use of technology associated with design and manufacture such as CAD and operations software. There are formal examinations at level five and in the final year depending upon the option chosen.

For A1, A2 and A4 these tend to lend themselves to the student assisting in designing their assignments by choosing the product/application to be analysed.

B. Subject-specific skills

To be able to

B1. apply appropriate design, analysis and synthesis skills in engineering (EA1p, EA2p, D4p, D5p)
B2. plan, develop, manage, evaluate and prioritise factors associated with engineering projects in the context of the product design cycle (D1p, D2p, D3p, D4p, D5p, D6p)
### B3. have the capacity and confidence to independently develop technical proficiencies and skills to solve engineering problems (EA3p, EA4p)

**B4. consider and prioritise relevant factors, including health, safety, environmental issues and risk, in the context of product engineering and the product design cycle.** (D2p, D1p, ET5p, ET6p)

<table>
<thead>
<tr>
<th><strong>Teaching and Learning Methods</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stage 1</strong> involves the introduction of engineering principles, design activity and technology to be related to range of applications through formal lectures, seminars, tutorials, workshop and technical activities. In stage 2 there is an increasing emphasis on integrating the aspects within design from physical laws to manufacturing organisation and methods through the direct introduction of work associated with the processes within the Product Design Cycle. Formal lectures, seminars, individual and team assignments and projects are used together with work based around the design and development and use of components and systems, manufacturing plant and technical equipment within Wharf Building. For the engineering project this is student centred learning with support from a project tutor. The Product Design Cycle provide provides a context for students progressing into activities associated with development of a product whether it be a simple form or engineering products. The Product Design Cycle requires consideration of the scale of manufacture, the available resources within design and manufacturing functions and the on-going needs of the stake-holders.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Assessment methods</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stage 1</strong> includes workbooks, reports, oral presentations and small assignments and formal examinations. <strong>Stage 2</strong> includes reports, group and individual working. There are a small number of examinations. Both individual and group presentations and viva voce are used. The engineering project is assessed by a combination of reports and viva voce.</td>
</tr>
</tbody>
</table>

### C. Thinking Skills

**To be able to**

- C1. apply knowledge skills and competences in an engineering context (EP1p, EP3p)
- C2. formulate and produce creative and innovative technical solutions to problems by applying engineering principles to real situations (SM1p, D4p, EA3p, EA4p)
- C4. evaluate alternative solutions to engineering problems (D1p, D2p, D3p, EP8p)
- C5. recognise the broader aspects of engineering in the business and industrial environment (EP1p, EP6p, ET4p)

<table>
<thead>
<tr>
<th><strong>Teaching and Learning Methods</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stage 1</strong> introduces engineering concepts and the use of learning outcomes in the curriculum. The approach is relatively direct and requires students to decompose engineering (design, organise and manufacture) and technical problems. Formal lectures supported with seminars and practical tests are used in the ‘scientific’ modules. The ‘technology’ modules use a more ‘hands-on’ approach using workshops, drawing rooms, CAD facilities, external visitor and student presentations. Students are required to decompose problems and given some direction on the governing relationships and principles. <strong>Stage 2</strong> requires the increasing integration across the modules culminating in the major project which is a major piece of individual work. Modules at level 6 make wide use of case study material.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Assessment methods</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stage 1</strong> includes reports on practical tests and a ‘design and make’ project, formal examinations and workbooks and drawings. <strong>Stage 2</strong> uses more marked developing assessment methods to require students to demonstrate integration across modules and disciplines and problems. These include formal reports with reflections on practical tests and designs, generating CAD models, reporting on computer based calculations around engineering software, generating and analysing simulation models for manufacture, and a major final year project. Students develop high level Computer Aided Design skills in the context of the need for rapid engineering of products and consistent development within group technologies. The common requirement is to have integrity of results across a wide variety of CAD applications in CAD.</td>
</tr>
</tbody>
</table>

### D. Other skills relevant to employability and personal development

**To be able to**

- D1. communicate ideas accurately, persuasively and succinctly in writing, orally and in a variety of media (D6p, EP3p)
- D2. work independently on processes associated with the product design cycle and demonstrate a high level of professional and ethical conduct (EP5p, EP6p, D2p)
D3. perform effectively in a team, and identify team characteristics and mechanics (EP9p)
D4. locate and critically use information from a variety of sources (EP4p)
D5. manage resources and time effectively (EP8p, EP9p, ET3p)
D6. undertake lifelong learning for continued professional development appropriate (ET1p, ET2p)

Teaching and Learning Methods
Teaching and learning methods include traditional lectures, tutorials, laboratory work, directed self-study, and project work. All modules cover these from Level 4 to Level 6. As the course progresses there is greater emphasis on independent learning and resource and time management. Students develop time management skills and subject specific skills through the use of their subject specific module at level 4. This is extended at level 5 with the Industrial Placement seminars. Students are encouraged at every level to undertake a one year Industrial Placement to greatly enhance their employability skills which are generally reflected within the judgement. Students develop the general learning outcomes within UK-SPEC across all of their study with a great deal of extra emphasis within their industrial placement in direct relation to their level of responsibility and also their project at level 6.

Assessment methods
The assessment methods develop as students progress through the course with a change in the balance from the testing of specific learning outcomes in a direct manner to requiring students to also develop the material used for reflection and commentary, this being in the form of written reports often based upon a computer-based case study. The emphasis enables and requires students to develop lifelong learning skills through the development of the relating of competences to the work requirements.

The Industrial Placement is assessed through the use of a 120 module, and the need to complete two reports using a chronologically based log of activities followed by a critical appraisal (commentary) that prepares them for their studies at level 6.

13. Programme Structures

<table>
<thead>
<tr>
<th>Level</th>
<th>Module Code</th>
<th>Module Title</th>
<th>Credit Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 6</td>
<td>MP3604</td>
<td>Advanced Computer Aided Design (COMP)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>MP3678</td>
<td>Principles of Engineering Simulation (COMP)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>MP3997</td>
<td>Project (C)</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>MP3732</td>
<td>Operations Management B (COMP)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>MP3610</td>
<td>Automated Production B (O)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>MP3774</td>
<td>Computer Aided Tribology (O)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>MP2899</td>
<td>Industrial Placement</td>
<td>120</td>
</tr>
</tbody>
</table>

14. Awards and Credits

<table>
<thead>
<tr>
<th>Level 5</th>
<th>Module Code</th>
<th>Module Title</th>
<th>Credit Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MP2715</td>
<td>Computer Aided Design &amp; Simulation Engineering Design &amp; Manufacture (COMP)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>MP2570</td>
<td>Thermo-fluids (COMP)</td>
<td>40</td>
</tr>
</tbody>
</table>

BEng (Hons) Computer Aided Engineering
360 credits including 220 credits at Level 5 or above and 100 credits at Level 6 or above.

BEng Computer Aided Engineering
320 credits including 180 credits at Level 5 or above and 60 credits at Level 6 or above.

Students who also successfully complete module MP2899 will receive the award “with Industrial Placement”

Diploma of Higher Education in Computer Aided Engineering
240 credits including 100 credits at Level 5 or above.
15. Personal Development Planning

Personal Development Planning (PDP) is:
- Reflection on learning, performance, and achievement
- Planning for personal, educational, and career development.

PDP involves review and reflection involving academic study, extra-curricular activities and career planning. It results in an understanding and ownership of learning. The student will be introduced to PDP during tutorial sessions which should be seen as an opportunity to develop a plan for the whole of the student’s time at University.

Since learning is a lifelong process the work in PDP is not assessed. There are many similarities to work-based learning, and Continued Professional Development (CPD) - which is required for membership of professional societies. The skills in PDP are key components of employability – self-reflection, recording, target setting, action planning and monitoring.

Web based materials relevant to PDP are found at:
Personal Development Planning www.uclan.ac.uk/ldu/resources/pdp/intro1.htm
Skills Learning Resources www.uclan.ac.uk/lskills/TLTP3/entersite.html

There is also information available which can be located using a web search engine.
At Induction the student takes part in a session involving a range of self-assessment exercises. This is followed by early in Semester 1 the student being recommended to access the Personal Development Planning web page (above), where there are a range of activities and exercises. The results of the activity or exercise are kept together in an A4 folder. A paper based system is suggested, due to concerns about the security, privacy, and long-term accessibility of records. This activity is reinforced by all first year students taking part in an event organised by ‘Frontier Education’ and based on the Mongolian ‘Yurts’ form of accommodation. This encourages communication and team working between students and fellow students, and between students and staff. Subsequently during tutorial sessions there will be discussion around PDP elements and in particular anything the student may have found difficult, or in which he/she needs assistance. Alternative approaches may be considered and discussed, if the student has particular issues. By the end of their University studies, the student is advised to have completed and reviewed all the activities and exercises.
**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.*

Minimum entry requirements for degree level study for students of Curriculum 2000 will be a 12 unit profile, which must be made up from one of the following configurations:

- Two A2 level subjects.
- One A2 level subject plus one single award Advanced VCE.
- One double award Advanced VCE.
- Two single award Advanced VCE.
- Plus evidence of Key Skills.

Although Year 12 (AS) qualifications will be a useful indicator of potential, offers of places will only be made against total achievement at the end of Year 13.

For guidance entry requirements for BEng(Hons) Computer Aided Engineering should be 300 points including Maths, Science or Technology at A2 level, and GCSE Maths and English at Grade C or above.

Other acceptable qualifications include:
- Scottish Certificate of Education Higher Grade passes.
- Irish Leaving Certificate Higher Grade passes.
- International Baccalaureate.
- An appropriate BTEC Certificate or Diploma - an average mark of 70% or an average of Distinction grade must have been achieved.
- Kitemarked Access Course.

Applications from individuals with non-standard qualifications, relevant work or life experience and who can demonstrate the ability to cope with and benefit from degree-level studies are considered.

If an applicant has gained a BTEC HND in Engineering it may be possible to enter the final year of the course. This will depend upon the BTEC units already gained and whether it is felt he/she is able to gain an honours degree qualification.

**EUE, Egypt:**

**Level 3 (FE) (Year 1):**
- 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.
- Egyptian National High School and its equivalent should fulfil the minimum percentage according to regulations of the Supreme Council of Egyptian Universities (Mathematical section).
- IGCES: 8 "O" Levels with minimum grade "C" + AS or AL (Math) with minimum grade "D".
- American Diploma: SAT 1 according to the regulations of the Supreme Council of Egyptian Universities.
- Universities: SAT II (including Math) according to the regulations of the supreme council of Egyptian Universities.
- Sitting for the English Placement Test is a must (IELTS 5.0).

**17. Key sources of information about the programme**

- [http://www.qaa.ac.uk/cmntwork/benchmark/engineering.pdf](http://www.qaa.ac.uk/cmntwork/benchmark/engineering.pdf)
- [http://search.ucas.co.uk/cgi-bin/hsrun/search/search/StateId/CHI9dwSg6ax-xbHCc76-KRdLTGQt - U2yj/HAHTpage/search.HsDetails.run?n=614369](http://search.ucas.co.uk/cgi-bin/hsrun/search/search/StateId/CHI9dwSg6ax-xbHCc76-KRdLTGQt - U2yj/HAHTpage/search.HsDetails.run?n=614369)
- [http://www.uclan.ac.uk/facs/destech/tech/tech_home/](http://www.uclan.ac.uk/facs/destech/tech/tech_home/)
- [http://www.uclan.ac.uk/courses/ug/beng_cae.htm](http://www.uclan.ac.uk/courses/ug/beng_cae.htm)
## 18. Curriculum Skills Map

*Please tick in the relevant boxes where individual Programme Learning Outcomes are being assessed*

<table>
<thead>
<tr>
<th>Level</th>
<th>Module Code</th>
<th>Module Title</th>
<th>Core (C), Compulsory (COMP) or Option (O)</th>
<th>Programme Learning Outcomes</th>
<th>Other skills relevant to employability and personal development</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Knowledge and understanding</td>
<td>Subject-specific Skills</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>A1</td>
<td>A2</td>
</tr>
<tr>
<td>LEVEL 6</td>
<td>MP3604</td>
<td>Advanced CAD</td>
<td>COMP</td>
<td>✔</td>
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<tr>
<td></td>
<td>MP3678</td>
<td>Principles of Engg Simulation</td>
<td>COMP</td>
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<td>✔</td>
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<tr>
<td></td>
<td>MP3732</td>
<td>Ops Management B</td>
<td>COMP</td>
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<td>MP3997</td>
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<td>C</td>
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<td>✔</td>
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<td>MP3610</td>
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<td>Comp. Aided Tribology</td>
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<td>LEVEL 5</td>
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<td>SC2153</td>
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<td>MP2899</td>
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<td>EL2104</td>
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<td>ER1630</td>
<td>Engineering Applications</td>
<td>COMP</td>
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</tr>
</tbody>
</table>
19. **LEARNING OUTCOMES FOR EXIT AWARDS:**

**Learning outcomes for the award of: CertHE**

Knowledge and understanding of some features, limitations and principles, and also some aspects of:
- A1 computer aided engineering.
- A2 systems simulation.
- A4 the role of engineering in an industrial and commercial context.
- A5 engineering science.

To some extent be able to:
- B1 apply appropriate design, analysis and synthesis skills in engineering.
- B2 plan, develop, manage, evaluate and prioritise factors associated with engineering projects in the context of the product design cycle.

**To some extent be able to**
- C1 apply knowledge skills and competences in an engineering context.
- C2 formulate and produce creative and innovative technical solutions to problems by applying engineering principles to real situations.
- C4 evaluate alternative solutions to engineering problems.
- C5 recognise the broader aspects of engineering in the business and industrial environment.

**Learning outcomes for the award of: DipHE**

Knowledge and understanding of many features, limitations and principles, and also many aspects of:
- A1 computer aided engineering.
- A2 systems simulation.
- A3 operations management.
- A4 the role of engineering in an industrial and commercial context.
- A5 engineering science.

To (much extent) be able to:
- B1 apply appropriate design, analysis and synthesis skills in engineering.
- B2 plan, develop, manage, evaluate and prioritise factors associated with engineering projects in the context of the product design cycle.
- B3 have the capacity and confidence to independently develop technical proficiencies and skills to solve engineering problems.
- B4 consider and prioritise relevant factors, including health, safety, environmental issues and risk, in the context of product engineering and the product design cycle.

**To (much extent) be able to**
- C1 apply knowledge skills and competences in an engineering context.
- C2 formulate and produce creative and innovative technical solutions to problems by applying engineering principles to real situations.
- C3 undertake and develop engineering work encompassing all aspects of the product cycle.
- C4 evaluate alternative solutions to engineering problems.
C5 recognise the broader aspects of engineering in the business and industrial environment.

To be able to (with confidence)
   D1 communicate ideas accurately, persuasively and succinctly in writing, orally and in a variety of media.
   D2 work independently on processes associated with the product design cycle and demonstrate a high level of professional and ethical conduct.
   D3 perform effectively in a team, and identify team characteristics and mechanics.
   D4 locate and critically use information from a variety of sources.
   D5 manage resources and time effectively.
   D6 undertake lifelong learning for continued professional development appropriate.

**Learning outcomes for the award of: BEng**

Knowledge and understanding of features, limitations and principles, and also much of
   A1 computer aided engineering.
   A2 systems simulation.
   A3 operations management.
   A5 the role of engineering in an industrial and commercial context.
   engineering science.

To be able to
   B1 apply appropriate design, analysis and synthesis skills in engineering.
   B2 plan, develop, manage, evaluate and prioritise factors associated with engineering projects in the context of the product design cycle.
   B3 have the capacity and confidence to independently develop technical proficiencies and skills to solve engineering problems.
   B4 consider and prioritise relevant factors, including health, safety, environmental issues and risk, in the context of product engineering and the product design cycle.

To be able to
   C1 apply knowledge skills and competences in an engineering context.
   C2 formulate and produce creative and innovative technical solutions to problems by applying engineering principles to real situations.
   C3 undertake and develop engineering work encompassing all aspects of the product cycle.
   C4 evaluate alternative solutions to engineering problems.
   C5 recognise the broader aspects of engineering in the business and industrial environment.

To be able to
   D1 communicate ideas accurately, persuasively and succinctly in writing, orally and in a variety of media.
   D2 work independently on processes associated with the product design cycle and demonstrate a high level of professional and ethical conduct.
   D3 perform effectively in a team, and identify team characteristics and mechanics.
   D4 locate and critically use information from a variety of sources.
   D5 manage resources and time effectively.
   D6 undertake lifelong learning for continued professional development appropriate.
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.

<table>
<thead>
<tr>
<th>13. Awarding Institution / Body</th>
<th>University of Central Lancashire</th>
</tr>
</thead>
<tbody>
<tr>
<td>14. Teaching Institution</td>
<td>University of Central Lancashire</td>
</tr>
<tr>
<td>15. University Department/Centre</td>
<td>School of Engineering</td>
</tr>
<tr>
<td>16. External Accreditation</td>
<td>Institutions of Mechanical Engineers and The Institution of Engineering Designers</td>
</tr>
<tr>
<td>17. Title of Final Award</td>
<td>MEng(Hons) Computer Aided Engineering</td>
</tr>
<tr>
<td>18. Modes of Attendance offered</td>
<td>Full-time, Sandwich and Part-time.</td>
</tr>
<tr>
<td>19. UCAS Code</td>
<td>H130/100160</td>
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<tr>
<td>20. Subject Benchmarking Group</td>
<td>QAA Engineering</td>
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<tr>
<td>21. Other external influences</td>
<td>Partner institutions &amp; Industrial links</td>
</tr>
<tr>
<td>22. Date of production/revision of this form</td>
<td>May 2019</td>
</tr>
</tbody>
</table>

23. Aims of the Programme

- To attract able and motivated students of high-calibre, both from within UK and overseas and equip them with a thorough understanding of computer aided engineering principles and practices.
- To provide students with an in-depth understanding of some specialised areas within computer aided engineering, through individual and team-based projects, usually in industrial environment.
- To develop the skills of:
  - communications e.g. report writing, giving presentations
  - use of information technology and appropriate computer-based tools
  - numeracy, e.g. mathematical analysis, graphical methods for representing experimental data
  - problem solving e.g. develop the ability to analyse a particular problem
  - individual study skills e.g. time management, planning, use of different information sources etc. working with others
- To prepare students for professional careers in computer aided engineering those of which require high levels of judgement, leadership, initiative, delegation and decision-making responsibilities.
- To fulfil educational requirements for future progression onto Chartered Engineer status.

24. Learning Outcomes, Teaching, Learning and Assessment Methods

The Engineering Council sets the overall requirements for the Accreditation of Higher Education Programmes (AHEP) in engineering, in line with the UK Standard for Professional Engineering Competence (UK-SPEC). AHEP sets the learning outcome for accredited degree programmes in five categories: Science and Mathematics (SM); Engineering Analysis (EA); Design (D); Economic, Legal, Social, Ethical and Environmental Context (ET); Engineering Practice (EP). The latest edition of AHEP can be found at this link: [http://www.engc.org.uk/ahep](http://www.engc.org.uk/ahep)
The following sections A, B, C, and D are written in the UCLan format, referring to the corresponding learning outcomes in AHEP (for partial CEng). Postfix 'm' indicates that the learning outcome is for full CEng accreditation.

### A. Knowledge and Understanding

Comprehensive knowledge and understanding both of the overall features, limitations and principles, and also of in-depth aspects of:

- A6. computer aided engineering (SM1m, SM4m, EA4m)
- A7. systems simulation (SM2m, SM5m, EA1m, EA2m, EA3m)
- A8. operations management (ET1m, ET2m, ET3m)
- A9. the role of engineering in an industrial and commercial context (ET4m, ET5m, ET6m)
- A10. engineering science (SM1m, SM2m, SM3m, SM6m)

### Teaching and Learning Methods

Stage 1 includes lectures, seminars, individual assignments with a small number of group assignments. A number of hours per week is spent in the student workshops to develop a direct experience of manufacturing processes. Use is made of specialist equipment within School of Engineering to introduce engineering principles.

Stage 2 includes individual and team assignments and projects of increasing complexity, some involving the use of relevant software packages. Use is made of the specialist equipment within engineering to further develop experience around the product cycle.

Stage 3 uses two individual projects (one at level 6 and one at level 7) and a group project (at level 7) to develop a wide range of projects skills that are essential for any Masters graduate. It is concerned with the formation, consolidation and development of competences associated with professional engineers. The work requires the extension of existing competences and the development of new ones. You will need to adapt existing methods and develop new ones to solve familiar and unfamiliar problems and identify any limitations within the full spectrum of activities you are involved with. You will be involved with a variety of aspects in solving engineering problems i.e. organisation, manufacture, responsibility, environmental, etc.

### Assessment methods

Stage 1 includes workbooks, reports, oral presentations, small assignments and formal examinations.

Stage 2 includes reports, group work, individual working, designing, manufacturing, viva voce, portfolios and associated commentaries, major project research and decomposition, planning, assessing individual and group profiles and use of technology associated with design and manufacture such as CAD and operations software. There are formal examinations at level five and level six.

Stage 3 includes reports, commentaries on portfolios and group working. The emphasis is on the analysis, decomposition, synthesis, evaluation and critical appraisal associated with problem solving and the full spectrum of the implications with any particular aspect.

The use of models and methods provides students with a basis for assessing their own and others’ roles within a project and team as well the manner in which a projects team might develop with time.

### B. Subject-specific skills

To be able to extensively:

- B5. apply appropriate design, analysis and synthesis skills in engineering (EA1m, EA2m, EA3m, EA4m, EA5m, EA6m, D4m, D8m)
- B6. plan, develop, manage, evaluate and prioritise factors associated with engineering projects in the context of the product design cycle (D1m, D2m, D3m, D5m, D6m, D7m, D8m)
- B7. have the capacity and confidence to independently develop technical proficiencies and skills to solve engineering problems (EA3m, EA4m, EA5m, EA6m, D8m)
- B8. consider and prioritise relevant factors, including health, safety, environmental issues and risk, in the context of product engineering and the product design cycle. (D2m, D1m, ET5m, ET6m, ET7m)

### Teaching and Learning Methods

Stage 1 involves the introduction of engineering principles, design activity and technology to be related to range of applications through formal lectures, seminars, tutorials, workshop and technical activities.

In stage 2 there is an increasing emphasis on integrating the aspects within design from physical laws to manufacturing organisation and methods through the direct introduction of work associated with the processes within the Product Cycle. Formal lectures, seminars, individual and team assignments and projects are used together with work based around the design and development and use of components and systems, manufacturing plant and technical equipment within Wharf Building. For the engineering project this is student centred learning with support from a project tutor.
In stage 3 the emphasis is on a wide variety of issues and aspects in engineering and the responsibilities of the professional engineer. The appraisal and review of the fuller implications and aspects of a decision is required.

The projects work provides students with experience of facing unknown knowledge and situations which is part of the initial stages in any project. There is also learning associated with a number of research areas and design methodologies and manufacturing scales and systems. These include work in tribology and the design and development of new and innovative products i.e. modern design engineering.

**Assessment methods**

Stage 1 includes workbooks, reports, oral presentations and small assignments and four formal examinations. Stage 2 includes reports, group and individual working. There are a small number of examinations. Both individual and group presentations and viva voce are used. The engineering project is assessed by a combination of reports and viva voce. Stage 3 continues the spectrum of assessments from stage two but requires increased critical appraisal, decomposition and analysis of all the activities in the context of both the product cycle and society in general. The use of presentations and commentaries and viva voce ensure that students have a direct experience of placing their efforts into context and defending and discussing their ideas and work.

**C. Thinking Skills**

To be able to widely

- C6. apply knowledge skills and competences in an engineering context (EP1m, EP3m, EP10m)
- C7. formulate and produce creative and innovative technical solutions to problems by applying engineering principles to real situations (SM1m, D4m, EA3m, EA4m)
- C8. undertake and develop engineering work encompassing all aspects of the product cycle (EP2m, EP4m, EP6m, EP7m)
- C9. evaluate alternative solutions to engineering problems (D1m, D2m, D3m, D7m, EP8m)
- C10. recognise the broader aspects of engineering in the business and industrial environment (D1m, D7m)

**Teaching and Learning Methods**

Stage 1 introduces engineering concepts and the use of learning outcomes in the curriculum. The approach is relatively direct and requires students to decompose engineering (design, organise and manufacture) and technical problems. Formal lectures supported with seminars and practical tests are used in the ‘scientific’ modules. The ‘technology’ modules use a more ‘hands-on’ approach using workshops, drawing rooms, CAD facilities, external visitor and student presentations. Students are required to decompose problems and given some direction on the governing relationships and principles.

Stage 2 requires the increasing integration across the modules culminating in the major project which is a major piece of individual work. In most modules at level 6 the extensive use of case studies is used.

Stage 3 is concerned with the approach of the professional engineer and aspects with postgraduate work in research and professional responsibility. Critical appraisal and review are the normal activities to be expected and must be in context of the problem, the solution and also the need to innovate and take up different viewpoints.

**Assessment methods**

Stage 1 includes reports on practical tests and a design and make project, formal examinations and workbooks and drawings.

Stage 2 uses more marked developing assessment methods to require students to demonstrate integration across modules and disciplines and problems. These include formal reports with reflections on practical tests and designs, generating CAD models, reporting on computer based calculations around engineering software, generating and analysing simulation models for manufacture, and a major third year project. The assessment is generally based around the learning outcomes in order to indicate the direction and the requirements. In most modules at level 6 the extensive use of case studies is used.

Stage 3 again is focussed around the learning outcomes which are derived from UK-SPEC and the development of engineers. There is a requirement to extend competences from stage 2 through the introduction of the need to examine boundaries on a number of dimensions. The problems are less well defined and the assessment is such that there is an expectation that boundaries will be defined and the limitations and implications explored and defined by the student and developed so they can be assessed. The group and individual projects extend the time management and project competences and require reflection, commentary and critical appraisal on a variety of aspects around personal working and technical developments and the wider implications. The use of commercial software has to be in the context of meaningful and traceable results (integrity) and in the context of a project with customer needs and commercial limits.

**D. Other skills relevant to employability and personal development**
To be able to extensively

D7. communicate ideas accurately, persuasively and succinctly in writing, orally and in a variety of media (D6m, EP3m)

D8. work independently on processes associated with the product design cycle and demonstrate a high level of professional and ethical conduct (EP5m, EP6m, D2m)

D9. perform effectively in a team, and identify team characteristics and mechanics (EP11m)

D10. locate and critically use information from a variety of sources (EP4m, EP6m)

D11. manage resources and time effectively (EP8m, EP9m, ET3m)

D12. undertake lifelong learning for continued professional development appropriate (ET1m, ET2m)

Teaching and Learning Methods

Teaching and learning methods include traditional lectures, tutorials, laboratory work, directed self-study, and project work. As the course progresses there is greater emphasis on independent learning and resource and time management. At stage 3 the emphasis is on developing an approach to problem solving through the solution of open ended problems, unfamiliar problems and the limitations and implications with solutions to problems.

Assessment methods

The assessment methods develop as students progress through the course with a change in the balance from the testing of specific leaning outcomes in a direct manner to requiring students to also develop the material used for reflection and commentary, this being in the form of written reports often based upon a computer-based case study. The emphasis enables and requires students to develop life long learning skills through the development of the relating of competences to the work requirements.

13. Programme Structures

<table>
<thead>
<tr>
<th>Level</th>
<th>Module Code</th>
<th>Module Title</th>
<th>Credit Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MP4580</td>
<td>The Engineer and Society (COMP)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>ER4587</td>
<td>Group Project (C)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>MP4582</td>
<td>Advanced Tribology (COMP)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>MP4583</td>
<td>Advanced Engineering Systems (COMP)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>ER4995</td>
<td>Project (C)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Either</td>
<td>Advanced Computer Aided Engineering (COMP)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Or</td>
<td>Advanced Mechatronics Systems</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>MP3604</td>
<td>Option modules (two of the following)</td>
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<tr>
<td></td>
<td>MP3672</td>
<td>Automated Production B (O)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>MP3995</td>
<td>Mod &amp; Control of Dynamic Sys (O)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>MP3732</td>
<td>Control Systems (O)</td>
<td>20</td>
</tr>
<tr>
<td>Level 6</td>
<td>MP3610</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>MP3590</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>EL3102</td>
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14. Awards and Credits

<table>
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<tr>
<th>Level</th>
<th>Module Code</th>
<th>Module Title</th>
<th>Credit Rating</th>
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<tbody>
<tr>
<td></td>
<td>MP3604</td>
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<td></td>
<td>MP3672</td>
<td>Engineering Simulation (COMP)</td>
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<td></td>
<td>MP3995</td>
<td>Project (C)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>MP3732</td>
<td>Operations Management B (COMP)</td>
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<tr>
<td></td>
<td>MP3610</td>
<td>Automated Production B (O)</td>
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<tr>
<td></td>
<td>MP3590</td>
<td>Mod &amp; Control of Dynamic Sys (O)</td>
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</tr>
<tr>
<td></td>
<td>EL3102</td>
<td>Control Systems (O)</td>
<td>20</td>
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</tbody>
</table>

MEng Computer Aided Engineering

Requires 480 credits including a minimum of 120 at Level 7 or above and 200 at Level 6 or above and 360 at level 5 or above.

BEng (Hons) Computer Aided Engineering

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

BEng Computer Aided Engineering

320 credits including 180 credits at Level 5 or above and 60 credits at Level 6 or above.
<table>
<thead>
<tr>
<th>Level 5</th>
<th>MP2899</th>
<th>Industrial Placement</th>
<th>120 Notional credits</th>
<th>'sandwich' route requires successful completion of MP2899 which has a notional credit rating of 120 credits</th>
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</thead>
<tbody>
<tr>
<td>Either</td>
<td>MP2715</td>
<td>Computer Aided Design &amp; Simulation</td>
<td>20</td>
<td>Diploma of Higher Education in Computer Aided Engineering 240 credits including 100 credits at Level 5 or above.</td>
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<tr>
<td>Or SC2153</td>
<td>Further Engineering Mathematics and Simulation (O)</td>
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<tr>
<td>Or MP2570</td>
<td>Engineering Design &amp; Manufacture (COMP)</td>
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<td>MP2576</td>
<td>Thermo-fluids (COMP)</td>
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<td>MP2721</td>
<td>Operations Management A (COMP)</td>
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<tr>
<td>Either</td>
<td>MP2590</td>
<td>Dynamic Modelling of Engineering Sys (O)</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Or EL2104</td>
<td>Instrumentation &amp; Control (O)</td>
<td>20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Level 4 | ER1010 | Engineering Analysis (COMP) | 30 | Certificate of Higher Education 120 credits at Level 4 or above. |
| ER1020 | Engineering Design (COMP) | 30 | |
| ER1030 | Engineering Science (COMP) | 30 | |
| ER1630 | Engineering Applications (COMP) | 30 | |

| Level 3 (FE) | ERC001 | Study Skills | 20 | Students who exit after the foundation entry year will receive a transcript of their grades |
| ERC002 | Basic Mathematics | 20 | |
| ERC003 | Information and Communications Technology | 20 | |
| ERC004 | Practical Skills | 20 | |
| ERC005 | Design Studies | 20 | |
| ERC006 | Analytical Studies | 20 | |

Note: Modules marked (C) are Core; (COMP) are Compulsory and (O) are Optional.

15. Personal Development Planning

Personal Development Planning (PDP) is:
- Reflection on learning, performance, and achievement
- Planning for personal, educational, and career development.

PDP involves review and reflection involving academic study, extra-curricular activities and career planning. It results in an understanding and ownership of learning. The student will be introduced to PDP during tutorial sessions which should be seen as an opportunity to develop a plan for the whole of the student’s time at University.

Since learning is a lifelong process the work in PDP is not assessed. There are many similarities to work-based learning, and Continued Professional Development (CPD) - which is required for membership of professional societies. The skills in PDP are key components of employability – self-reflection, recording, target setting, action planning and monitoring.

Web based materials relevant to PDP are found at:
- Personal Development Planning [www.uclan.ac.uk/ldu/resources/pdp/intro1.htm](http://www.uclan.ac.uk/ldu/resources/pdp/intro1.htm)
- Skills Learning Resources [www.uclan.ac.uk/lskills/TLTP3/entersite.html](http://www.uclan.ac.uk/lskills/TLTP3/entersite.html)

There is also information available which can be located using a web search engine.
At Induction the student takes part in a session involving a range of self-assessment exercises. This is followed by early in Semester 1 the student being recommended to access the Personal Development Planning web page (above), where there are a range of activities and exercises. The results of the activity or exercise are kept together in an A4 folder. A paper based system is suggested, due to concerns about the security, privacy, and long-term accessibility of records. This activity is reinforced by all first year students taking part in an event organised by ‘Frontier Education’ and based on the Mongolian ‘Yurts’ form of accommodation. This encourages communication and team working between students and fellow students, and between students and staff. Subsequently during tutorial sessions there will be discussion around PDP elements and in particular anything the student may have found difficult, or in which he/she needs assistance. Alternative approaches may be considered and discussed, if the student has particular issues. By the end of their University studies, the student is advised to have completed and reviewed all the activities and exercises.

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.*

Minimum entry requirements for degree level study for students of Curriculum 2000 will be a 12 unit profile, which must be made up from one of the following configurations:

- Three A2 level subjects.
- Two A2 level subjects plus one single award Advanced VCE.
- One A2 level subject plus one double award Advanced VCE.
- One A2 level subject plus two single award Advanced VCE.
- Plus evidence of Key Skills.

Although Year 12 (AS) qualifications will be a useful indicator of potential, offers of places will only be made against total achievement at the end of Year 13.

For guidance entry requirements for M. Eng. (Hons) Computer Aided Engineering should be 300 points including Maths, Science or Technology at A2 level, and GCSE Maths and English at Grade B or above.

Other acceptable qualifications include:

- Scottish Certificate of Education Higher Grade passes (AAAA)
- Irish Leaving Certificate Higher Grade passes (AAABB)
- International Baccalaureate (32 points)
- An appropriate BTEC Certificate or Diploma - an average of distinction grade must have been achieved.
- Kitemarked Access Course.

Applications from individuals with non-standard qualifications, relevant work or life experience and who can demonstrate the ability to cope with and benefit from degree-level studies are considered.

If an applicant has gained a BTEC HND in Engineering it may be possible to achieved entry with advanced standing. Applicants should note that a minimum period of study may apply.

17. Key sources of information about the programme

- [http://www.qaa.ac.uk/crntwork/benchmark/engineering.pdf](http://www.qaa.ac.uk/crntwork/benchmark/engineering.pdf)
<table>
<thead>
<tr>
<th>Level</th>
<th>Module Code</th>
<th>Module Title</th>
<th>Core (C), Compulsory (COMP) or Option (O)</th>
<th>Knowledge and understanding</th>
<th>Programme Learning Outcomes</th>
<th>Other skills relevant to employability and personal development</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A1</td>
<td>A2</td>
<td>A3</td>
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<td></td>
<td>ER4995</td>
<td>Project</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td></td>
<td>ER4587</td>
<td>Group Project</td>
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<tr>
<td></td>
<td>MP4580</td>
<td>Engineer and Society</td>
<td>COMP</td>
<td>✓</td>
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<td></td>
<td>MP4582</td>
<td>Advanced Tribology</td>
<td>COMP</td>
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<td>MP4583</td>
<td>Advanced Engineering Systems</td>
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<td>Level 6</td>
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<td>MP3610</td>
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19. LEARNING OUTCOMES FOR EXIT AWARDS:

Learning outcomes for the award of: CertHE

Knowledge and understanding of some features, limitations and principles, and also some aspects of
A1 computer aided engineering.
A2 systems simulation.
A4 the role of engineering in an industrial and commercial context.
A5 engineering science.

To some extent be able to
B1 apply appropriate design, analysis and synthesis skills in engineering.
B2 plan, develop, manage, evaluate and prioritise factors associated with engineering projects in the context of the product design cycle.

Learning outcomes for the award of: DipHE

Knowledge and understanding of many features, limitations and principles, and also many aspects of
A1 computer aided engineering.
A2 systems simulation.
A3 operations management.
A4 the role of engineering in an industrial and commercial context.
A5 engineering science.

To (much extent) be able to
B1 apply appropriate design, analysis and synthesis skills in engineering.
B2 plan, develop, manage, evaluate and prioritise factors associated with engineering projects in the context of the product design cycle.
B3 have the capacity and confidence to independently develop technical proficiencies and skills to solve engineering problems.
B4 consider and prioritise relevant factors, including health, safety, environmental issues and risk, in the context of product engineering and the product design cycle.

To (much extent) be able to
C1 apply knowledge skills and competences in an engineering context.
C2 formulate and produce creative and innovative technical solutions to problems by applying engineering principles to real situations.
C3 undertake and develop engineering work encompassing all aspects of the product cycle.
C4 evaluate alternative solutions to engineering problems.
C5 recognize the broader aspects of engineering in the business and industrial environment.

To be able to (with confidence)
  D1 communicate ideas accurately, persuasively and succinctly in writing, orally and in a variety of media.
  D2 work independently on processes associated with the product design cycle and demonstrate a high level of professional and ethical conduct.
  D3 perform effectively in a team, and identify team characteristics and mechanics.
  D4 locate and critically use information from a variety of sources.
  D5 manage resources and time effectively.
  D6 undertake lifelong learning for continued professional development appropriate.

Learning outcomes for the award of: BEng

Knowledge and understanding of features, limitations and principles, and also much of
  A1 computer aided engineering.
  A2 systems simulation.
  A3 operations management.
  A5 the role of engineering in an industrial and commercial context.
  engineering science.

To be able to
  B1 apply appropriate design, analysis and synthesis skills in engineering.
  B2 plan, develop, manage, evaluate and prioritise factors associated with engineering projects in the context of the product design cycle.
  B3 have the capacity and confidence to independently develop technical proficiencies and skills to solve engineering problems.
  B4 consider and prioritise relevant factors, including health, safety, environmental issues and risk, in the context of product engineering and the product design cycle.

To be able to
  C1 apply knowledge skills and competences in an engineering context.
  C2 formulate and produce creative and innovative technical solutions to problems by applying engineering principles to real situations.
  C3 undertake and develop engineering work encompassing all aspects of the product cycle.
  C4 evaluate alternative solutions to engineering problems.
  C5 recognise the broader aspects of engineering in the business and industrial environment.

To be able to
  D1 communicate ideas accurately, persuasively and succinctly in writing, orally and in a variety of media.
  D2 work independently on processes associated with the product design cycle and demonstrate a high level of professional and ethical conduct.
  D3 perform effectively in a team, and identify team characteristics and mechanics.
  D4 locate and critically use information from a variety of sources.
  D5 manage resources and time effectively.
  D6 undertake lifelong learning for continued professional development appropriate.

Learning outcomes for the award of: BEng (Hons)

Knowledge and understanding of features, limitations and principles, and also all aspects of
  A1 computer aided engineering.
  A2 systems simulation.
A3 operations management.
A4 the role of engineering in an industrial and commercial context.
A5 engineering science.

To be able to
B1 apply appropriate design, analysis and synthesis skills in engineering.
B2 plan, develop, manage, evaluate and prioritise factors associated with engineering projects in the context of the product design cycle.
B3 have the capacity and confidence to independently develop technical proficiencies and skills to solve engineering problems.
B4 consider and prioritise relevant factors, including health, safety, environmental issues and risk, in the context of product engineering and the product design cycle.

To be able to
C1 apply knowledge skills and competences in an engineering context.
C2 formulate and produce creative and innovative technical solutions to problems by applying engineering principles to real situations.
C3 undertake and develop engineering work encompassing all aspects of the product cycle.
C4 evaluate alternative solutions to engineering problems.
C5 recognise the broader aspects of engineering in the business and industrial environment.

To be able to
D1 communicate ideas accurately, persuasively and succinctly in writing, orally and in a variety of media.
D2 work independently on processes associated with the product design cycle and demonstrate a high level of professional and ethical conduct.
D3 perform effectively in a team, and identify team characteristics and mechanics.
D4 locate and critically use information from a variety of sources.
D5 manage resources and time effectively.
D6 undertake lifelong learning for continued professional development appropriate.