Course Handbook

BEng (Hons) Mechanical Engineering
MEng (Hons) Mechanical Engineering
2019/20

Course Leader for BEng (Hons)/MEng (Hons) Mechanical Engineering:

Dr Andrew Fsadni

School of Engineering

COURSE SUBJECT TO CHANGE

This course is subject to formal course review and reapproval by the University during 2018/19 as part of its normal cycle of regular review (a process called Periodic Review). Course information and programme specifications are updated and reviewed as part of this process and course structure and content may be changed to enable the University to deliver a better quality of educational experience to students. This can be in response to various factors including: student feedback; annual reports from external examiners; feedback from the sector or industry advisors or as part of the regular review process by course teams.

This process may well result in changes to the structure and content of the current course as outlined in this Handbook. Any changes made as a result of the process will be immediately included in the course documentation and all students holding current offers will be provided with revised versions prior to the commencement of their programme. If you are not satisfied with the changes, you will be offered the opportunity to withdraw from the programme and, if required, reasonable support to transfer to another provider. The expected timetable for completion of this reapproval process is August 2019.

*subject to reapproval

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.

Contents

1. Welcome to the course

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

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

Dr Andrew Fsadni – Course Leader for BEng/MEng (Hons) Mechanical Engineering

1.1 Rationale, aims and learning outcomes of the course

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) Mechanical Engineering with Industrial Placement.

The aims of the Mechanical Engineering courses are

BEng

• To attract able and motivated students of high-calibre, both from within UK and overseas and equip them with an in-depth understanding of mechanical engineering principles and practices.
• To provide students with skills to systematically apply those engineering principles to solve salient and unpredictable real-world engineering problems.
• To equip students with necessary skills and expertise required to design, analyse and optimise mechanical systems.
• 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 from both within UK and overseas and equip them with a thorough understanding of mechanical engineering principles and practices.
• To provide students with skills to systematically apply those engineering principles to solve complex and unpredictable real-world engineering problems, with great autonomy.
• To equip students with necessary skills and expertise required to design, analyse and optimize mechanical systems..
• To provide students with an in-depth understanding of some specialized areas within mechanical engineering, through industrially-relevant individual and group projects. • To prepare students for professional careers in mechanical engineering requiring high levels of judgement, leadership, initiative, delegation and decision-making responsibilities.
• To fulfil educational requirements for future progression to Chartered Engineer status.

1.2 Course Team

Staff	Room	Telephone	E-mail address
Dr Akinola Adeniyi	CM131	01772-893853	AAdeniyi@uclan.ac.uk
Dr Ahmed Wael Al Shaer	KM127	01772-893279	AWAlShaer@uclan.ac.uk
Dr Joel Allison	CM131	01772-893252	JAllison@uclan.ac.uk
Tony Broad	CM123/WB4	01772-893358	AIBroad@uclan.ac.uk
Dr Hadley Brooks	CM124	01772-893326	HLBrooks@uclan.ac.uk
Dr Graham Calderbank	CM028	01772-893318	GJCalderbank@uclan.ac.uk
Dr Matt Dickinson	CM123	01772-893261	MDickinson1@uclan.ac.uk
Dr Gonzalo Garcia-Atance Fatjo	CM027	01772-893323	GGarcia-AtanceFatjo@uclan.ac.uk
Dr Jonathan Francis	CM023	01772-893229	JFrancis1@uclan.ac.uk
Dr Andrew Fsadni	CM127	01772-893812	Afsadni@uclan.ac.uk
Dr Liben Jiang	KM127	01772-895789	LJiang2@uclan.ac.uk
Dr Ahmed Onsy	CM109	01772-893266	AOnsy@uclan.ac.uk
Dr Nathalie Renevier	CM037	01772-893316	NRenevier@uclan.ac.uk
Patrick Ryan	CM109	01772-893273	PRyan1@uclan.ac.uk
Dr Jules Simo	CM021	01772-893545	JSimo@uclan.ac.uk
Prof Ian Sherrington	CM110	01772-893322	ISherrington@uclan.ac.uk
Dr Justin Whitty	CM127	01772-893274	JWhitty@uclan.ac.uk
Dr Muqi Wulan	CM037	01772-893247	MWulan@uclan.ac.uk

1.3 Expertise of staff

Dr Akinola Adeniyi: is a Lecturer in Mechanical and Motorsports Engineering. He had BEng (Hons) from University of Ilorin, Nigeria and MSc in Mechanical Engineering from University College London (UCL). He was a PhD researcher and later a Research fellow at the Rolls-Royce funded University Technology Centre (UTC) in Gas Turbine Transmissions Systems of the University of Nottingham. He researched on multiphase oil-air flow within the aeroengine bearing chambers using Computational Fluid Dynamics (CFD) techniques. He has interest in Computational Mechanics and currently working on next generation turbomachines.

Dr Ahmed Wael Al Shaer: After finishing his Masters in Advanced Manufacturing Technonlogy and systems Management, Dr Al Shaer completed his PhD in the elimination of porosity in laser welding of Al alloys at The University of Manchester. He worked for the industry for more than 3.5 years and served in the academia for more than 2 years before joining UCLAN as a lecturer in mechanical and manufacturing engineering. His current research area includes laser processing of materials, such as additive manufacturing and laser cuting and welding, and their modelling using SPH and other CFD methods.

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.

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.

Dr Hadley Brooks has been a mechanical engineering lecturer at the University of Central Lancashire since January 2012. He specialises in novel manufacturing technologies and product innovation. He previously worked at the Lancaster Product Development Unit at Lancaster University providing engineering design and prototyping expertise. Hadley is research active within the area of digital engineering and is a member of the Advanced Digital Manufacturing Technology Research Centre.

Dr Graham Calderbankhas 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).

Dr 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.

Dr Gonzalo Garcia-Atance Fatjo finished his PhD in Tribology in 2010. His PhD research was focused on the erosion of technical ceramic due to cavitation where he found out a delay in the phase transformation of metastable zirconia and made a contribution in the understanding of the erosion mechanism in ceramics. Also, he developed a mathematical model to explain the location of cavitation clusters within the liquid by combining Analytical Mechanics Principles with Fluid Mechanics. Previous to his PhD, he conducted a short research project funded by SKF Research & Development Co. to assess the performance of ceramics materials used in bearings subjected to cavitation erosion. He has been involved in research of lubrication monitoring and lubricant testing. He is currently conducting research at UCLAN in piston engines. His goal is to improve the understanding of the lubrication of the ring pack.

Dr Andrew Fsadni joined the University of Central Lancashire in January 2012 after completing his research work as an EPSRC Industrial CASE researcher at Brunel University. Prior to this, he worked in the automotive industry as a component design engineer and later as an industrial energy auditor. Andrew graduated as a mechanical engineer from the University of Malta in 2003. He has also read for an executive MBA and an MSc, both awarded with distinction, by the Universities of Malta and Brunel respectively. He is a chartered engineer and is currently involved in research projects investigating multiphase flow, most notably nanofluids for enhanced heat transfer efficiencies.

Dr Liben Jiang: Having finished his first and master degrees in Xi'an Jiaotong University, China, with experiences of working with Chinese industry and research councils, Dr Liben Jiang joined the University of Nottingham, UK for a PhD study with a project titled "A solar powered heating/cooling/power tri-generation system for buildings". After successful completion of his PhD study, he spent another 2 ½ years there as a postdoctoral research fellow working on an EPSRC funded project in the field of thermoelectric heat pumping system, exploring the effective heat recovery by using rotating heat pipes and thermoelectric devices. During the nearly 6 years of research life in the University of Nottingham, Dr Jiang intensively strengthened his research skills including designing and setting up testing rigs, measuring and analysing data, and programming/mathematical simulation.

Dr Ahmed Onsy Ahmed Onsy is the academic lead in Mechanical Engineering. He has been awarded his PhD from the School of Mechanical and Systems Engineering, Mechatronics Group and Design Unit, Newcastle University, UK. His main research interests are intelligent diagnostics and health management systems, smart maintenance systems, advanced mechatronics, and embedded systems which can be directly applied to Intelligent Diagnostic and Health Management (DHM) and Predictive Health Monitoring (PHM) systems for oil well, wind turbine, aerospace (SHM & HUM), marine, and automotive applications. Ahmed is contributing to research within the area of Tribotronics and is a member of the Jost Institute for Tribotechnology.

Dr Nathalie Renevier is a Senior Lecturer in Tribotechnology (coatings) and Course Leader for undergraduate Maintenance Engineering courses. She has a physics, material sciences and business background with over 10 years' experience in the industry across Europe. Her expertise is in the development of plasma assisted processes and products, surface characterisations, tribological testing of thin films and thick films, nano-tribology and Lean Six-Sigma methodologies

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.

Prof 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.

Dr. Jules Simo is a Lecturer in the School of Engineering and Course Leader for MEng/BEng (Hons) Aerospace Engineering at the University of Central Lancashire, which he joined in 2015 following five years as an Academic Visitor at the Advanced Space Concepts Laboratory at the University of Strathclyde (UK). In 2007, he was awarded a Marie Curie Fellowship under the European Commission (EC)'s Sixth Framework Programme (FP6). Prior to gaining a research fellow post in the Department of Mechanical and Aerospace Engineering at the University of Strathclyde, where he also completed his Ph.D. on the Dynamics, Stability and Control of Displaced Lunar Orbits. He was a research assistant at the University of Paderborn in Germany. He studied Computer Science and Applied Mathematics at the University of Yaounde in Cameroon and the University of Paderborn.

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

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

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

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

Foster Building
Forensic and Applied Sciences
Pharmacy and Biomedical Sciences
Psychology
Physical Sciences

telephone: 01772 891990/891991
email: FosterHub@uclan.ac.uk

Computing and Technology Building

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

Greenbank Building

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

Brook Building

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

1.6 Communication

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

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

1.7 External Examiner

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

Professor Peter White, Emeritus Professor of Thermofluid Dynamics, Faculty of Engineering, Environment and Computing, Coventry University, UK

2. Structure of the course

2.1 Overall structure

There is a Foundation Entry year available for this programme. Please refer to the programme specification in the appendix of this handbook for further information on modules of 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). Each of the modules being sub-divided by the necessary National Qualification Framework (NFQ) levels; in full-time mode these levels coincide with years 1, 2, 3 and 4 respectively. Note all modules quoted here may be subject to change as required by IMechE accreditation process and/or suitable academic development and/or dialogue with industry.

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.

Modules at level 4

- ER1010 Engineering Analysis (30 credits)
- ER1630 Engineering Applications (30 credits)
- ER1020 Engineering Design (30 credits)
- ER1030 Engineering Science (30 credits)

Modules at level 5

- MP2570 Design and Manufacture (40 credits)

- MP2576 Thermo-fluids (20 credits)
- MP2784 Mechanics, Kinematics, and Materials (20 credits)
- MP2721 Operations Management A (20 credits)
- SC2153 Further Engineering Mathematics and Simulation (20 credits)
- MP2899 Industrial Placement (120 Credits) Optional

Modules at level 6

- MP3997 Project (30 credits)
- MP3395 Mechanical Engineering Systems (30 credits)

For BEng only

- MP3604 Advanced CAD OR MP3672 Engineering Simulation (20 credits)
- MP3701 Mechanical Reliability (20 credits)
- MP3731 Engineering Design (20 credits)

For MEng only

- SC3007 Advanced Mathematical and Simulation Methods OR MP3672 Engineering Simulation (20 credits)
- MP3732 Operations Management B (20 credits)
- MP3713 Mechanics & Materials (20 credits)

Modules at level 7

- ER4995 Project (20 credits)
- ER4587 Group Project (20 credits)
- MP4580 Engineer and Society (20 credits)
- MP4582 Advanced Tribology (20 credits)
- MP4583 Advanced Engineering Systems (20 credits)
- ER4120 Computational Mechanics (20 credits)

2.3 Course requirements & Accreditation

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

BEng (Hons) Mechanical 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 accredited by the Institution of Mechanical Engineers (IMechE) and the Institution of Engineering Designers (IED) as follows: BEng Mechanical Engineering partially meets education requirement for Chartered Engineer status (CEng) and MEng Mechanical 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 Module Registration Options

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

A timetable will be available once you have enrolled on the programme, through the student portal.

2.5.2 Expected hours of study

20 credits is a standard module size and equals 200 notional learning hours.
That is to say, the normal amount of work involved in achieving a successful outcome to your studies is to study for 10 hours per each credit you need to achieve – this includes attendance at UCLan and time spent in private study.
This requirement translates to a total of 6 hours per 20 credit module per week. We expect that you commit 36 hours study per week (pro-rata for part-time students and/or semester-based modules), inclusive of your contact hours. So for a typical module you may have a 2 hour lecture, and a 1 hour tutorial, leaving you approximately 3 hours for self-directed study (further reading, tutorial questions, assignments, revision). Often you will be working in groups for practical work and you should try and arrange to meet up outside the scheduled class times. You will also need to use equipment such as computer and laboratory facilities for practical work, again sometimes outside the scheduled class times.

2.5.3 Attendance Requirements

You are required to attend all timetabled learning activities for each module. Notification of illness or exceptional requests for leave of absence must be made to:
Course Administration Service: ☎ 01772 891994 or 01772 891995 | ✉ CandThub@uclan.ac.uk

Exceptional absence requests are made to **Dr Ahmed Onsy** Academic Lead for Mechanical Engineering): ☎ 01772 89 3266 | ✉ AOnsy@uclan.ac.uk

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

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

3. Approaches to teaching and learning

3.1 Learning and teaching methods

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

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

It should be emphasised that the purpose of assessment is to not only grade you, and provide information to facilitate management of the course, but also to provide feedback to you. In this way you can monitor your own progress, refine your own judgement of your abilities and regulate it accordingly. You should keep all the returned work in a file and you may have to submit this at the end of the year for the external examiners to assess. Individual module leaders will distribute information on the methods of assessment used, and their weighting, at the start of each module.

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

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.

WISER http://www.uclan.ac.uk/students/study/wiser/index.php
IT Skills training https://www.uclan.ac.uk/students/study/it_skills_training.php
Worldwise Learning Centre
https://www.uclan.ac.uk/students/study/worldwise/index.php

3.3 Learning resources

3.3.1 Learning Information Services (LIS)

At UCLan all laboratories, workshops and other specialised equipment and facilities are centrally managed, thus making them available to users right across the campus. For further information please visit: http://www.uclan.ac.uk/students/study/specialist_teaching_resources/index.php.

3.3.2 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!

Careers 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

Within the school of engineering you will find many people will be happy to help you. For module related support, you would normally contact the module tutor in the first instance. Likewise for course enquiries your course leader will assist. Your academic advisor will also be able to provide support and direction on a number of matters. For more general enquiries the you can visit any one of the hubs. There are helpful guides available online too, just visit:
http://www.uclan.ac.uk/students/

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

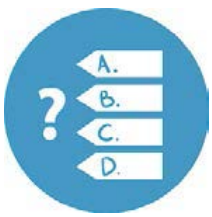
Arrangements are made for students who have a disability/learning difficulty for which valid supporting evidence can be made available. Contact the Disability Adviser for advice and information, disability@uclan.ac.uk

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

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

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 (a guide to this system can be found on the WISER Blackboard space, accessed through the student portal).
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.

5.5 Cheating, plagiarism, collusion or re-presentation

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

6. Classification of Awards

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

7. Student Feedback

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

In addition to the on-going 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.

The Students Union can support you in voicing your opinion, provide on-going advice and support, and encourage your involvement in all feedback opportunities. They will be requesting that you complete the National Student Survey (during semester 2 for students in their final year of study) or the UCLan Student Survey (all other students).

The Students' Union and University work closely together to ensure that the student voice is heard in all matters of student-life. We encourage students to provide constructive feedback throughout their time at university, through course reps, surveys and any other appropriate means,

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 recognize 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 organization 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;

8. Appendices

8.1 Programme Specification(s)

UNIVERSITY OF CENTRAL LANCASHIRE

Programme Specification

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided.

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

1. Awarding Institution / Body	University of Central Lancashire.
2. Teaching Institution and Location of Delivery	University of Central Lancashire.
3. University School/Centre	Engineering
4. External Accreditation	IMechE and IED
5. Title of Final Award	BEng (Hons) Mechanical Engineering
6. Modes of Attendance offered	Full-time; Part-time; Sandwich
7. UCAS Code	H301 Engineering.
8. **Relevant Subject Benchmarking Group(s)**	QAA Engineering BEng
9. Other external influences	Engineering Council UK-SPEC Accreditation requirements of IMechE Accreditation requirements of IED QAA Academic Infrastructure Codes of Practice Science, Technology, Engineering & Mathematics (STEM) government initiatives
10. **Date of production/revision of this form**	June 2017
11. **Aims of the Programme**	
• To attract able and motivated students of high-calibre, both from within UK and overseas and equip them with an in-depth understanding of mechanical engineering principles and practices.	

- To provide students with skills to systematically apply those engineering principles to solve salient and unpredictable real-world engineering problems.
- To equip students with necessary skills and expertise required to design, analyse and optimise mechanical systems.
- 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

A1: Demonstrate knowledge and understanding of essential facts, concepts, theories and principles of the Mechanical Engineering discipline, and its underpinning science and mathematics. **(SM1p, SM2p).**

A2: Appreciation of the wider multidisciplinary engineering context and its underlying principles. **(SM3p).**

A3: Appreciation of the social, environmental, ethical, economic and commercial considerations affecting the exercise of engineering judgement. **(ET1p, ET2p).**

A4: The ability to learn new theories, concepts, methods etc in unfamiliar situations. **(EP8p).**

Teaching and Learning Methods

Knowledge acquisition occurs initially through tutor-led lectures (teaching) and directed study of textbooks and journal articles. This is followed up by student led learning activity using text (books and e-resources), media (software, video, technical articles) and Active Enquiry research methods.

The understanding of much engineering knowledge (learning) comes by application, use, and observation of effect. This is aided by tutorials, worked examples, analysis, synthesis, and Active Enquiry. Great benefit comes from this occurring in a group environment, where understanding can be developed by support from others. The tutor in these situations takes the role of a Mentor.

The Teaching and Learning strategies employed deliver opportunities for the achievement of the learning outcomes, demonstrate their attainment and recognise the range of student backgrounds. Delivery methods, activities and tasks are aligned with the learning outcomes for this programme, taking account of the learning styles and stage of the student.

Curriculum design is informed by the research, scholarship, and engineering activities of the staff, in line with the established criteria for accredited engineering degree programmes. Industrially relevant applications and examples of the material are essential to student understanding and future use. Delivery methods and curriculum design evolve in response to generic and discipline-specific developments, taking into account educational research, changes in national policy, industrial practice and the needs of employers. The context of the curriculum contains the generic social, legal, environmental and economic factors relevant to engineering, and topical factors (sustainability, and carbon footprint for example).

Assessment methods

Assessment of Knowledge is through examination of key facts using unseen papers. These may be formal end of year examinations, or 'phase tests' focussing on a limited range of material during the year. The grades achieved are according to the Principles of Assessment, and results moderated by peer lecturers. Consideration of results at Module and Course Assessment Boards lead to recommendations for student Progression and Awards.

Assessment of Understanding of the knowledge (and knowledge itself if appropriate) is through assignment or other coursework. This is a structured application of knowledge derived from the tutor led and student based activity. In later years the scope of the assignment brief becomes much greater. Knowledge moves into application, to critical evaluation to working with knowledge in context with increasing uncertainty. The assessment here importantly includes team contribution to the end result, and the Group Project is a major aspect of an engineering degree qualification.

Assessment is a measure against the benchmark criteria, and forms an important part of the learning process too. Formative feedback is widespread through guidance in tutorials and some submitted coursework. Summative feedback combines both generic feedback (often verbal) with individual written feedback. Used wisely, these act as a great boost to student learning.

The assessment of the Module Learning Outcomes through assignments and examinations are mapped to the Programme Learning Outcomes (in this section), which are directly linked to the Aims of the Programme, which in turn are in line with Accreditation, subject and other academic requirements.

B. Subject-specific skills

B1: Practical Engineering competence acquired in laboratories; workshops; industry; individual & group project work, design work; and development & use of computer software. **(EP3p).**
B2: Knowledge and understanding of scientific, mathematical, and associated engineering principles necessary to underpin activities in Mechanical Engineering. **(SM1p, EA1p)**.
B3: Creative use of engineering principles in problem solving, design, explanation and diagnosis. **(EA1p, EA2p, EA3p, EA4p)**.
B4: Create and develop economically viable products, processes and systems to meet defined needs. **(D1p, D2p, D3p, D4p, D5p, D6p)**.
B5: Specify and develop engineering activities to promote sustainable development in an economic, social and environmental context. **(ET1p, ET2p, ET3p, ET4p, ET5p, ET6p).**
B6: Practical application of competence in professional engineering practice. **(EP1p, EP2p, EP3p, EP4p, EP5p, EP6p, EP7p)**.

Teaching and Learning Methods

The development of Skills involves some tuition, some practice and considerable experience in using the skills in Engineering situations. This is a major feature of an engineering degree, and the methods of teaching, learning and assessment are constructed so that the learning activities and assessment tasks are relevant to Mechanical Engineering competences.

Skill development is specific to the Mechanical Engineering destinations of the graduates. Within that scope, there are areas which are generic to engineering (such as workshop practices), those which are expected in an engineering degree (such as advanced simulation of fluid flow problems), and those which are programme specific (such as entrepreneurial business skills).

The degree provides significant exposure to hands-on laboratory work and substantial individual project work, both at final year and developing through the course. Both design and Active Enquiry (research-led) projects are used, which develop both independence of thought and the ability to work effectively in a team.

Development of team working within the engineering design context is a strong feature of the provision. This enthuses students in their study, and creates graduates able to contribute immediately to their employment. The Placement activity is a significant aspect of the programme, both for the successful placement student and the culture of the final three years of the degree.

Assessment methods

Assessment of subject specific skills is by the results of application of the skill. This is apparent in the response to assignments and other coursework. It is seen as progression through fundamentals of (level 3); knowledge about (level 4); application of (level 5); critical evaluation of (level 6) and optimal solutions around (level 7) appropriate Mechanical Engineering skills.

The grades achieved are generated in line with the Principles of Assessment, and results moderated by peer lecturers. Skill assessment does require a high level of competence in the skill by the assessing

member of staff. Consideration of results at Module and Course Assessment Boards lead to recommendations for student Progression and Awards.

Assessment is a measure against the benchmark criteria, and forms an important part of the learning process too. Formative feedback is widespread through guidance in tutorials and some submitted coursework. Summative feedback combines both generic feedback (often verbal) with individual written feedback. Used wisely, these act as a great boost to student learning.

The assessment of the Module Learning Outcomes through assignments and examinations are mapped to the Programme Learning Outcomes (in this section), which are directly linked to the Aims of the Programme, which in turn are in line with Accreditation, subject and other academic requirements.

C. Thinking Skills

C1: Apply appropriate quantitative science and engineering tools to the analysis of problems. **(EA3p)**.
C2: Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs. **(D4p)**.
C3: Comprehend the broad picture and thus work with an appropriate level of detail. **(D3p, EA4p)**.
C4: Develop, monitor and update a plan, to reflect a changing operating environment. **(D5p, EP8p)**.

Teaching and Learning Methods

The exercise and development of 'Thinking Skills' are achieved through active learning processes. Problem solving is the key to many engineering activities, and progresses in complexity and demand through the course. The emphasis on analysis, synthesis, critical evaluation, and optimisation moves steadily from the former to the latter, whilst all elements are present in some form throughout. Staff interests and research often form the background to developments in active learning.

Implementation of this is seen through the use of workshops, drawing/CAD facilities, dedicated software, laboratories, rapid / additive manufacture techniques, bureau manufacturing, student presentations, external visitors, and field/industry based activity. Although requiring specialised facilities compared to some other course provision, this is a hall mark of the engineering provision. These learning processes compliment the more conventional seminars, tutorials and case study approaches found in HE.

The academic progression through the provision is from level 3 'foundation', level 4 'knowledge', level 5 'application', level 6 'creation and critical evaluation', to level 7 'innovation and optimisation in problem solving' is in line with QAA Qualification Descriptors. Gradually more integration across the modules occurs, culminating in the final year Project. This is a major piece of individual work. The Level 6 Case Studies in Innovation and Level 7 Innovation in Problem Solving module are major Group Projects. There is extensive group, and later team, working as a natural part of the working (and learning) environment in engineering.

Although not formally a part of the course provision, there is extensive extra-curricular activity arising from staff, technician and student interests.

Assessment methods

Assessment of thinking skills is by reports on practical investigations and tests, a 'design and make' project, formal examinations, workbooks and drawings in early stages of the course provision.

Assessment methods develop to use demonstration of integration of ideas across modules, disciplines and problems. These include case studies; formal reports with reflection on practical activities; design and manufacture processes and results; generating and analysing CAD, CIM, and other simulation models; computer software based analysis and calculations; and evaluation of prototypes. The independent final Project and group project based assessments demonstrate capability in skills related to individual specialised knowledge, understanding and practical aspects. Unseen examinations are appropriate for assessment of some intellectual skills under time constrained conditions.

Intellectual skills related to practical activity are developed through the experience of the activity in an appropriate context. These include the Engineering workshops and laboratory equipment, practical

manufacture of prototypes during modules, the final Project, Creation and Evaluation, and level 7 Innovation in Problem Solving. Workbooks and guidance manuals are used widely in earlier years. The optional Placement provides additional opportunities for the students choosing to take it.

D. Other skills relevant to employability and personal development

D1: Developed transferable skills that will be of value in a wide range of situations, including Problem solving; Communication; and Working with others. **(EP9p).**

D2: Effective use of general IT [information technology] facilities and information retrieval skills. **(EP2p, EP4p).**

D3: Planning self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development]. **(SM1p, ET4p)**.

D4: Monitor and adjust a personal programme of work on an ongoing basis, and to learn independently. **(EP8p, D1p, D2p)**.

Teaching and Learning Methods

The Induction for the course starts the Personal Development Planning (PDP) programme, which is seen to continue after graduation as Continuing Professional Development (CPD). CPD is a compulsory feature of most professions including engineering. The scope for self-managed development and maximising potential from the opportunities available is outlined. Prior experience of similar schemes in colleges is expected to be incorporated.

Communication, team working, engineering problem solving and design, reflective use of available software, planning, critical evaluation, verification of results, confidence in outcomes, inter-personal skills, emotional intelligence, and goal setting all feature and are emphasised at various points through the programme. The University Personal Tutor system is a useful vehicle for discussion of these aspects of personal development. However, much is learnt in the day to day interactions with staff, industry visitors, and other students.

Skills may additionally be developed by individual choice to engage in extra-curricular activity, work experience, student representation, and wider social and cultural activities. The approach taken is to provide awareness, some tools, and indications of where to go for specific information.

Assessment methods

Assessment of transferable skills is by clearly labelled learning outcomes, and by indirectly through measure of developing engineering competence. Much of the work beyond Level 4 of the course indicates the need for improving transferable skills, and is difficult to excel at if this is not achieved.

Written communication skills are developed and assessed through the context for the assessment. Examples include the requirements for a formal report, laboratory report, business or technical justification, reflective report, critical evaluation in a Commentary, or statement of confidence in a decision made in complex and un-predictable situations. Group based activity requires reflection on the performance of the individual within that context. Team based activities require an assessment of the team formation; the impact of intrinsic and extrinsic factors; and contribution to the outcome.

Effective use of the internet and web based infrastructure, including remote working are essential to engineers. These skills develop naturally out of the learning environment, which is facilitated by engineers with ongoing extensive industry experience. The easy transition of engineering graduates from related areas of study into key professional engineering positions and careers is attributed to the emphasis on the ‘Real Engineering’ context.

13. Programme Structures*				14. Awards and Credits*
NQF	**Module Code**	**Module Title**	**Credit rating**	
6	MP3997	Project (C)	30	**BEng (Hons) Mechanical Engineering** Requires a minimum of 360 credits with 240 at Stage 2, including a minimum of 320 at Level 4 or above, 220 at Level 5 or above and 100 at Level 6 or above. The Project module and MP3510 cannot be condoned. **BEng Mechanical Engineering** Requires a minimum of 320 credits with 200 at Stage 2, including a minimum of 280 at Level 4 or above, 180 at Level 5 or above and 60 at Level 6 or above. Industrial placement route requires successful completion of MP2899 which has a national credit of 120 credits
	MP3731	Engineering Design (COMP)	20	
	MP3395	Mechanical Engineering Systems (COMP)	30	
	MP3701	Mechanical Reliability (COMP)	20	
	MP3672 OR MP3604	Engineering Simulation (O) Advanced CAD (O)	20 20	
5	MP2899	Industrial Placement (O)	120	
5	MP2570	Design and Manufacture (COMP)	40	**Diploma of Higher Education** Requires a minimum of 240 credits with 120 at Stage 2, including a minimum of 200 at Level 4 or above, and 100 at Level 5 or above.
	MP2576	Thermo-fluids (COMP)	20	
	SC2153	Further Engineering Mathematics and Simulation (COMP)	20	
	MP2721	Operations Management A (COMP)	20	
	MP2784	Mechanics, Kinematics, and Materials (COMP)	20	
4	ER1010 ER1020 ER1030 ER1630	Engineering Analysis (COMP) Engineering Design (COMP) Engineering Science (COMP) Engineering Applications (COMP)	30 30 30 30	**Certificate of Higher Education** Requires a minimum of 120 credits, including a minimum of 100 at Level 4 or above.

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

15. Personal Development Planning

The course approach to Personal Development Planning (PDP) has been influenced by the LTSN Generic Centre Guide to Curriculum Design: Personal Development Planning. PDP activity is centred on:

- Reflection on learning, performance, and achievement.
- Planning for personal, educational, and career development.

Students are invited to review and reflect on their academic study, extra-curricular activities and career planning. This results in an increased understanding and ownership of learning.

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. Local web based materials relevant to PDP are found at:

Generic: http://www.uclan.ac.uk/information/services/ldu/pdp/generic_PDP_index.php.

Employability and Skills: http://www.uclan.ac.uk/information/services/ldu/employability_and_skills.php

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 local web based materials, and other materials found by individual need or interest. 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 for all first year students by encouraging communication and team working between students, and between students and staff.

Subsequently during group tutorial sessions discussion is directed towards PDP elements. Any topics found difficult, or needing further work are discussed. Alternative approaches are considered and discussed. Opportunities with Wiser (http://www.uclan.ac.uk/information/services/wiser/index.php), eLearn (http://www.uclan.ac.uk/information/services/wiser/elearn.php), offering study skill support, Flying Start for new students (http://www.uclan.ac.uk/information/services/wiser/flying_start_induction_pack.php), and Peer Mentoring (http://www.uclan.ac.uk/information/services/sas/m_and_m/mandm.php) are used.

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) Mechanical 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. Please consult the UCLAN admissions department for the most up to date requirements.
17. Key sources of information about the programme
http://www.uclan.ac.uk/schools/computing_engineering_physical/engineering_courses.php
http://www.uclan.ac.uk/information/courses/index.php
http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/Engineering10.pdf
http://www.engc.org.uk/professional-qualifications/standards/uk-spec
http://www.heacademy.ac.uk/resources/detail/resource_database/id56_guide_to_curriculum_design_pdp

18. Curriculum Skills Map

Level	Module Code	Module Title	Core (C), Compulsory (COMP) or Option (O)	Programme Learning Outcomes																	
				Knowledge and Understanding				Subject Specific Skills						Thinking Skills				Other Skills			
				A1	A2	A3	A4	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D1	D2	D3	D4
6	MP3604	Advanced CAD	O	✓				✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	
	MP3672	Engineering Simulation	O	✓			✓		✓	✓	✓	✓		✓	✓	✓		✓		✓	
	MP3997	Project	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	MP3731	Engineering Design	COMP	✓					✓	✓	✓	✓		✓	✓	✓				✓	
	MP3701	Mechanical Reliability	COMP	✓					✓	✓	✓	✓			✓	✓				✓	
	MP3395	Mechanical Engineering Systems	COMP	✓			✓		✓	✓	✓	✓		✓	✓	✓		✓		✓	
5	MP2899	Industrial Placement	O		✓	✓		✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
	MP2570	Design & Development	COMP	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	
	MP2576	Thermo-fluids	COMP	✓				✓	✓	✓	✓		✓	✓	✓				✓	✓	
	SC2153	Further Engineering Mathematics and Simulation	COMP	✓	✓		✓		✓	✓				✓	✓		✓	✓	✓		✓
	MP2784	Mechanics, Kinematics, and Materials	COMP	✓				✓	✓	✓	✓		✓	✓							
	MP2721	Operations Management A	COMP	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
4	ER1010	Engineering Analysis	COMP	✓					✓	✓				✓	✓					✓	
	ER1630	Engineering Applications	COMP	✓				✓	✓	✓	✓			✓	✓			✓	✓	✓	
	ER1020	Engineering Design	COMP	✓				✓	✓				✓						✓	✓	
	ER1030	Engineering Science	COMP	✓				✓		✓	✓			✓				✓		✓	

Note: *Mapping to other external frameworks, e.g. professional/statutory bodies, will be included within Student Course Handbooks*

19. LEARNING OUTCOMES FOR EXIT AWARDS:

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

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

Learning outcomes for the award of: CertHE

Demonstrate knowledge and understanding of some of the essential facts, concepts, theories and principles of the Mechanical Engineering discipline, and its underpinning science and mathematics.

Practical Engineering competence acquired in specific laboratories; workshops; industry; individual & group project work, design work; and development & use of computer software.

Knowledge and understanding of some scientific, mathematical, and associated engineering principles necessary to underpin activities in Mechanical Engineering.

Creative use of fundamental engineering principles in problem solving, design, explanation and diagnosis.

Create and develop some aspects of economically viable products, processes and systems to meet defined needs.

Practical application of competence in professional engineering practice.

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

Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs.

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

Developed some transferable skills that will be of value in a wide range of situations, including Problem solving; Communication; and Working with others.

Effective use of some general IT [information technology] facilities and information retrieval skills.

Planning self-learning and improving performance (as starter), as the foundation for lifelong learning/CPD [continuing professional development].

Learning outcomes for the award of: DipHE

Demonstrate knowledge and understanding of the essential facts, concepts, theories and principles of the Mechanical Engineering discipline, and its underpinning science and mathematics.

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

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

The ability to learn new theories, concepts, methods etc in many unfamiliar situations.

Practical Engineering competence acquired in laboratories; workshops; industry; individual & group project work, design work; and development & use of computer software.

Knowledge and understanding of scientific, mathematical, and associated engineering principles necessary to underpin activities in Mechanical Engineering.

Creative use of engineering principles in problem solving, design, explanation and diagnosis.

Create and develop many aspects of economically viable products, processes and systems to meet defined needs.

Specify and develop limited engineering activities to promote sustainable development in an economic, social and environmental context.

Practical application of competence in professional engineering practice.

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

Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs.

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

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

Developed many transferable skills that will be of value in a wide range of situations, including Problem solving; Communication; and Working with others.

Effective use of many general IT [information technology] facilities and information retrieval skills.

Planning self-learning and improving performance (with confidence), as the foundation for lifelong learning/CPD [continuing professional development].

Monitor and adjust a personal programme of work on an ongoing basis, and to learn independently.

Learning outcomes for the award of: BEng

Demonstrate knowledge and understanding of the essential facts, concepts, theories and principles of the Mechanical Engineering discipline, and its underpinning science and mathematics.

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

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

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

Practical Engineering competence acquired in laboratories; workshops; industry; individual & group project work, design work; and development & use of computer software.

Knowledge and understanding of scientific, mathematical, and associated engineering principles necessary to underpin activities in Mechanical Engineering.

Creative use of engineering principles in problem solving, design, explanation and diagnosis.

Create and develop of economically viable products, processes and systems to meet defined needs.

Specify and develop engineering activities to promote sustainable development in an economic, social and environmental context.

Practical application of competence in professional engineering practice.

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

Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs.

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

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

Developed transferable skills that will be of value in a wide range of situations, including Problem solving; Communication; and Working with others.

Effective use of general IT [information technology] facilities and information retrieval skills.

Planning self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development].

Monitor and adjust a personal programme of work on an ongoing basis, and to learn independently.

UNIVERSITY OF CENTRAL LANCASHIRE

Programme Specification

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided.

1. Awarding Institution / Body	University of Central Lancashire.
2. Teaching Institution and Location of Delivery	University of Central Lancashire.
3. University School/Centre	Engineering
4. External Accreditation	IMechE and IED
5. Title of Final Award	MEng (Hons) Mechanical Engineering.
6. Modes of Attendance offered	Full Time; Part time; Sandwich
7. UCAS Code	H300 Engineering.
8. Relevant Subject Benchmarking Group(s)	QAA Engineering BEng and extended to include MEng.
9. Other external influences	Engineering Council UK-SPEC. Accreditation requirements of IMechE. Accreditation requirements of IED. QAA Academic Infrastructure Codes of Practice. Science, Technology, Engineering & Mathematics (STEM) government initiatives.
10. Date of production/revision of this form	September 2017
11. Aims of the Programme	
• To attract able and motivated students from both within UK and overseas and equip them with a thorough understanding of mechanical engineering principles and practices.	
• To provide students with skills to systematically apply those engineering principles to solve complex and unpredictable real-world engineering problems, with great autonomy.	
• To equip students with necessary skills and expertise required to design, analyse and optimize mechanical systems..	
• To provide students with an in-depth understanding of some specialized areas within mechanical engineering, through industrially-relevant individual and group projects. • To prepare students for professional careers in mechanical engineering requiring high levels of judgement, leadership, initiative, delegation and decision-making responsibilities.	

- To fulfil educational requirements for future progression to 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 full CEng). Postfix 'm' Indicates that the learning outcome is for full CEng accreditation.

A. Knowledge and Understanding

A1: Demonstrate comprehensive knowledge and understanding of essential facts, concepts, theories and principles of the Mechanical Engineering discipline, and its underpinning science and mathematics. **(SM1m, SM2m).**
A2: Appreciation of the wider multidisciplinary engineering context and its underlying principles. **(SM3m, SM6m).**
A3: Appreciation of the social, environmental, ethical, economic and commercial considerations affecting the exercise of engineering judgement. **(ET1m, ET2m).**
A4: The ability to learn new theories, concepts, methods in complex and unfamiliar situations. **(ET8m).**

Teaching and Learning Methods

Knowledge acquisition occurs initially through tutor-led lectures (teaching) and directed study of textbooks and journal articles. This is followed up by student led learning activity using text (books and e-resources), media (software, video, technical articles) and Active Enquiry research methods.
The understanding of much engineering knowledge (learning) comes by application, use, and observation of effect. This is aided by tutorials, worked examples, analysis, synthesis, and Active Enquiry. Great benefit comes from this occurring in a group environment, where understanding can be developed by support from others. The tutor in these situations takes the role of a Mentor.
The Teaching and Learning strategies employed deliver opportunities for the achievement of the learning outcomes, demonstrate their attainment and recognise the range of student backgrounds. Delivery methods, activities and tasks are aligned with the learning outcomes for this programme, taking account of the learning styles and stage of the student.
Curriculum design is informed by the research, scholarship, and engineering activities of the staff, in line with the established criteria for accredited engineering degree programmes. Industrially relevant applications and examples of the material are essential to student understanding and future use. Delivery methods and curriculum design evolve in response to generic and discipline-specific developments, taking into account educational research, changes in national policy, industrial practice and the needs of employers. The context of the curriculum contains the generic social, legal, environmental and economic factors relevant to engineering, and topical factors (sustainability, and carbon footprint for example).

Assessment methods

Assessment of Knowledge is through examination of key facts using unseen papers. These may be formal end of year examinations, or 'phase tests' focussing on a limited range of material during the year. The grades achieved are according to the Principles of Assessment, and results moderated by peer lecturers. Consideration of results at Module and Course Assessment Boards lead to recommendations for student Progression and Awards.
Assessment of Understanding of the knowledge (and knowledge itself if appropriate) is through assignment or other coursework. This is a structured application of knowledge derived from the tutor led and student based activity. In later years the scope of the assignment brief becomes much greater. Knowledge moves into application, to critical evaluation to working with knowledge in context with increasing uncertainty. The assessment here importantly includes team contribution to the end result, and the Group Project is a major aspect of an engineering degree qualification.
Assessment is a measure against the benchmark criteria, and forms an important part of the learning process too. Formative feedback is widespread through guidance in tutorials and some submitted coursework. Summative feedback combines both generic feedback (often verbal) with individual written feedback. Used wisely, these act as a great boost to student learning.

The assessment of the Module Learning Outcomes through assignments and examinations are mapped to the Programme Learning Outcomes (in this section), which are directly linked to the Aims of the Programme, which in turn are in line with Accreditation, subject and other academic requirements.

B. Subject-specific skills

B1: Practical Engineering competence acquired in laboratories; workshops; industry; individual & group project work, design work; and development & use of computer software. **(EP3m).**

B2: A comprehensive Knowledge and understanding of scientific, mathematical, and associated engineering principles necessary to underpin activities in Mechanical Engineering. **(SM1m, EA1m)**.

B3: Creative use of engineering principles in problem solving, design, explanation and diagnosis. **(EA1m, EA2m, EA3m, EA4m)**.

B4: Create and develop economically viable products, processes and systems to meet defined needs. **(D1m, D2m, D3m, D4m, D5m, D6m)**.

B5: Specify and develop engineering activities to promote sustainable development in an economic, social and environmental context. **(ET1m, ET2m, ET3m, ET4m, ET5m, ET6m).**

B6: Practical application of competence in professional engineering practice. **(EP1m, EP2m, EP3m, EP4m, EP5m, EP6m, EP7m)**.

Teaching and Learning Methods

The development of Skills involves some tuition, some practice and considerable experience in using the skills in Engineering situations. This is a major feature of an engineering degree, and the methods of teaching, learning and assessment are constructed so that the learning activities and assessment tasks are relevant to Mechanical Engineering competences.

Skill development is specific to the Mechanical Engineering destinations of the graduates. Within that scope, there are areas which are generic to engineering (such as workshop practices), those which are expected in an engineering degree (such as advanced simulation of fluid flow), and those which are programme specific (such as entrepreneurial business skills).

The course provides significant exposure to hands-on laboratory work and substantial individual project work, both at final year and developing through the course. Both design and Active Enquiry (research-led) projects are used, which develop both independence of thought and the ability to work effectively in a team.

Development of team working within the engineering design context is a strong feature of the provision. This enthuses students in their study, and creates graduates able to contribute immediately to their employment. The Placement activity is a significant aspect of the programme, both for the successful placement student and the culture of the final three years of the degree.

Assessment methods

Assessment of subject specific skills is by the results of application of the skill. This is apparent in the response to assignments and other coursework. It is seen as progression through fundamentals of (level 3); knowledge about (level 4); application of (level 5); critical evaluation of (level 6) and optimal solutions around (level 7) appropriate Mechanical Engineering skills.

The grades achieved are generated in line with the Principles of Assessment, and results moderated by peer lecturers. Skill assessment does require a high level of competence in the skill by the assessing member of staff. Consideration of results at Module and Course Assessment Boards lead to recommendations for student Progression and Awards.

Assessment is a measure against the benchmark criteria, and forms an important part of the learning process too. Formative feedback is widespread through guidance in tutorials and some submitted coursework. Summative feedback combines both generic feedback (often verbal) with individual written feedback. Used wisely, these act as a great boost to student learning.

The assessment of the Module Learning Outcomes through assignments and examinations are mapped to the Programme Learning Outcomes (in this section), which are directly linked to the Aims of the Programme, which in turn are in line with Accreditation, subject and other academic requirements.

C. Thinking Skills

C1: Apply appropriate quantitative science and engineering tools to the analysis of problems.**(EA3m)**.

C2: Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs. **(D4m)**.

C3: Comprehend the broad picture and thus work with an appropriate level of detail. **(D3m, EA4m)**.

C4: Develop, monitor and update a plan, to critically reflect a changing operating environment. **(D5m, EP8m)**.

Teaching and Learning Methods

The exercise and development of 'Thinking Skills' are achieved through active learning processes. Problem solving is the key to many engineering activities, and progresses in complexity and demand through the course. The emphasis on analysis, synthesis, critical evaluation, and optimisation moves steadily from the former to the latter, whilst all elements are present in some form throughout. Staff interests and research often form the background to developments in active learning.

Implementation of this is seen through the use of workshops, drawing/CAD facilities, dedicated software, laboratories, rapid / additive manufacture techniques, bureau manufacturing, student presentations, external visitors, and field/industry based activity. Although requiring specialised facilities compared to some other course provision, this is a hall mark of the engineering provision. These learning processes compliment the more conventional seminars, tutorials and case study approaches found in HE.

The academic progression through the provision is from level 4 'knowledge', level 5 'application', level 6 'creation and critical evaluation', to level 7 'innovation and optimisation in problem solving' is in line with QAA Qualification Descriptors. Gradually more integration across the modules occurs, culminating in the final year Project. This is a major piece of individual work. The Level 6 Case Studies in Innovation and Level 7 Innovation in Problem Solving module are major Group Projects. There is extensive group, and later team, working as a natural part of the working (and learning) environment in engineering.

Although not formally a part of the course provision, there is extensive extra-curricular activity arising from staff, technician and student interests.

Assessment methods

Assessment of thinking skills is by reports on practical investigations and tests, a 'design and make' project, formal examinations, workbooks and drawings in early stages of the course provision.

Assessment methods develop to use demonstration of integration of ideas across modules, disciplines and problems. These include case studies; formal reports with reflection on practical activities; design and manufacture processes and results; generating and analysing CAD, CIM, and other simulation models; computer software based analysis and calculations; and evaluation of prototypes. The independent final Project and group project based assessments demonstrate capability in skills related to individual specialised knowledge, understanding and practical aspects. Unseen examinations are appropriate for assessment of some intellectual skills under time constrained conditions.

Intellectual skills related to practical activity are developed through the experience of the activity in an appropriate context. These include the Engineering workshops and laboratory equipment, practical manufacture of prototypes during modules, the final Project, Creation and Evaluation, and level 7 Innovation in Problem Solving. Workbooks and guidance manuals are used widely in earlier years. The optional Placement provides additional opportunities for the students choosing to take it.

D. Other skills relevant to employability and personal development

D1: Developed transferable skills that will be of value in a wide range of situations, including Leadership, Problem solving; Communication; and Working with others. **(EP9m).**

D2: Effective use of general IT [information technology] facilities and information retrieval skills. **(EP2m, EP4m).**

D3: Planning self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development]. **(SM1m, ET4m)**.

D4: Monitor and adjust a personal programme of work on an ongoing basis, and to learn independently. **(EP8m, D1m, D2m)**.

Teaching and Learning Methods

The Induction for the course starts the Personal Development Planning (PDP) programme, which is seen to continue after graduation as Continuing Professional Development (CPD). CPD is a compulsory feature of most professions including engineering. The scope for self-managed development and maximising potential from the opportunities available is outlined. Prior experience of similar schemes in colleges is expected to be incorporated.

Communication, team working, engineering problem solving and design, reflective use of available software, planning, critical evaluation, verification of results, confidence in outcomes, inter-personal skills, emotional intelligence, and goal setting all feature and are emphasised at various points through the programme. The University Personal Tutor system is a useful vehicle for discussion of these aspects of personal development. However, much is learnt in the day to day interactions with staff, industry visitors, and other students.

Skills may additionally be developed by individual choice to engage in extra-curricular activity, work experience, student representation, and wider social and cultural activities. The approach taken is to provide awareness, some tools, and indications of where to go for specific information.

Assessment methods

Assessment of transferable skills is by clearly labelled learning outcomes, and by indirectly through measure of developing engineering competence. Much of the work beyond Level 4 of the course indicates the need for improving transferable skills, and is difficult to excel at if this is not achieved.

Written communication skills are developed and assessed through the context for the assessment. Examples include the requirements for a formal report, laboratory report, business or technical justification, reflective report, critical evaluation in a Commentary, or statement of confidence in a decision made in complex and un-predictable situations. Group based activity requires reflection on the performance of the individual within that context. Team based activities require an assessment of the team formation; the impact of intrinsic and extrinsic factors; and contribution to the outcome.

Effective use of the internet and web based infrastructure, including remote working are essential to engineers. These skills develop naturally out of the learning environment, which is facilitated by engineers with ongoing extensive industry experience. The easy transition of engineering graduates from related areas of study into key professional engineering positions and careers is attributed to the emphasis on the ‘Real Engineering’ context.

13. Programme Structures				14. Awards and Credits
Lvl	**Module code**	**Module Title**	**Credit Rating**	
7	ER4120	Computational Mechanics (COMP)	20	**A minimum of 240 credits must be studied at this University on this programme.** **MEng (Hons) Mechanical Engineering** Requires a minimum of 480 credits with 120 at Stage 2 and 240 at Stage 3, including a minimum of 460 at Level 4 or above, 360 at Level 5 or above, 200 at Level 6 or above and 120 at Level 7 or above. Work placement route requires successful completion of MP2899 which has a national credit of 120 credits
	MP4580	Engineer and Society (COMP)	20	
	ER4587	Group Project (C)	20	
	ER4995	Project (C)	20	
	MP4582	Advanced Tribology (COMP)	20	
	MP4583	Advanced Engineering Systems (COMP)	20	
6	MP3997	Project (C)	30	**BEng (Hons) Mechanical Engineering** Requires a minimum of 360 credits with 240 at Stage 2, including a minimum of 320 at Level 4 or above, 220 at Level 5 or above and 100 at Level 6 or above. The Project module cannot be compensated. **BEng Mechanical Engineering** Requires a minimum of 320 credits with 200 at Stage 2, including a minimum of 280 at Level 4 or above, 180 at Level 5 or above and 60 at Level 6 or above. The Project module cannot be compensated.
	MP3732	Operations Management B (COMP)	20	
	MP3395	Mechanical Engineering Systems (COMP)	30	
	MP3713	Mechanics & Materials (COMP)	20	
	MP3672	Engineering Simulation (O)	20	
	OR	OR	20	
	SC3007	Advanced mathematical & simulation methods (O)		
5	MP2899	Industrial Placement (O)	120	
5	MP2570	Design and Manufacture (COMP)	40	**Diploma of Higher Education** Requires a minimum of 240 credits with 120 at Stage 2, including a minimum of 200 at Level 4 or above, and 100 at Level 5 or above.
	MP2576	Thermo-fluids (COMP)	20	
	SC2153	Further Engineering Mathematics and Simulation (COMP)	20	
	MP2784	Mechanics, Kinematics, and Materials (COMP)	20	
	MP2721	Operations Management A (COMP)	20	
4	ER1010	Engineering Analysis (COMP)	30	**Certificate of Higher Education** Requires a minimum of 120 credits, including a minimum of 100 at Level 4 or above.
	ER1020	Engineering Design (COMP)	30	
	ER1030	Engineering Science (COMP)	30	
	ER1630	Engineering Applications (COMP)	30	

15. Personal Development Planning

The course approach to Personal Development Planning (PDP) has been influenced by the LTSN Generic Centre Guide to Curriculum Design: Personal Development Planning. PDP activity is centred on:

- Reflection on learning, performance, and achievement.
- Planning for personal, educational, and career development.

Students are invited to review and reflect on their academic study, extra-curricular activities and career planning. This results in an increased understanding and ownership of learning.

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. Local web based materials relevant to PDP are found at:

Generic: http://www.uclan.ac.uk/information/services/ldu/pdp/generic_PDP_index.php.

Employability and Skills: http://www.uclan.ac.uk/information/services/ldu/employability_and_skills.php

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 local web based materials, and other materials found by individual need or interest. 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 for all first year students by encouraging communication and team working between students, and between students and staff.

Subsequently during group tutorial sessions discussion is directed towards PDP elements. Any topics found difficult, or needing further work are discussed. Alternative approaches are considered and discussed. Opportunities with Wiser (http://www.uclan.ac.uk/information/services/wiser/index.php), eLearn (http://www.uclan.ac.uk/information/services/wiser/elearn.php), offering study skill support, Flying Start for new students (http://www.uclan.ac.uk/information/services/wiser/flying_start_induction_pack.php), and Peer Mentoring (http://www.uclan.ac.uk/information/services/sas/m_and_m/mandm.php) are used.

By the end of their University studies, the student is advised to have completed and reviewed all the activities and exercises.

16. Admissions Criteria

Programme Specifications include minimum entry requirements, including academic qualifications, together with appropriate experience and skills required for entry to study. These criteria may be expressed as a range rather than a specific grade. Amendments to entry requirements may have been made after these documents were published and you should consult the University's website for the most up to date information.

Students will be informed of their personal minimum entry criteria in their offer letter.

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) Mechanical 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.

Please consult the UCLAN admissions department for the most up to date requirements.

17. Sources Of Information
http://www.uclan.ac.uk/schools/computing_engineering_physical/engineering_courses.php
http://www.uclan.ac.uk/information/courses/index.php
http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/Engineering10.pdf
http://www.engc.org.uk/professional-qualifications/standards/uk-spec
http://www.heacademy.ac.uk/resources/detail/resource_database/id56_guide_to_curriculum_design_pdp

18. Curriculum Skills Map

Level	Module Code	Module Title	Core (C), Compulsory (COMP) or Option (O)	Programme Learning Outcomes																
				Knowledge and Understanding				Subject Specific Skills						Thinking Skills				Other Skills		
				A1	A2	A3	A4	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D1	D2	D3	D4
7	ER4120	Computational Mechanics	COMP	✓			✓	✓	✓	✓			✓	✓				✓	✓		✓
	ER4995	Project	C	✓	✓	✓	✓			✓						✓	✓		✓	✓	✓
	ER4587	Group Project	C			✓		✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
	MP4580	Engineer and Society	COMP			✓					✓	✓				✓		✓		✓	✓
	MP4582	Advanced Tribology	COMP	✓	✓			✓	✓		✓	✓		✓	✓	✓	✓				
	MP4583	Advanced Engineering Systems	COMP	✓	✓		✓		✓	✓			✓	✓	✓				✓		
6	MP3672	Engineering Simulation (O)	O	✓	✓			✓	✓	✓			✓	✓	✓			✓	✓		
	SC3007	Advanced mathematical & simulation methods (O)	O	✓			✓	✓	✓				✓	✓					✓		
	MP3997	Project	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	MP3713	Mechanics and Materials	COMP	✓	✓	✓			✓	✓	✓	✓			✓	✓				✓	✓
	MP3732	Operations Management B	COMP			✓			✓	✓	✓				✓	✓		✓		✓	✓
	MP3395	Mechanical Engineering Systems	COMP	✓		✓	✓		✓	✓	✓	✓		✓	✓	✓		✓		✓	✓
5	MP2899	Industrial Placement	COMP		✓	✓		✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
	MP2570	Design & Development	COMP	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	
	MP2576	Thermo-fluids	COMP	✓				✓	✓	✓	✓		✓	✓	✓				✓	✓	
	SC2153	Further Engineering Mathematics and Simulation	COMP	✓	✓		✓		✓	✓				✓	✓		✓	✓	✓		✓
	MP2784	Mechanics, Kinematics, and Materials	COMP	✓				✓	✓	✓	✓		✓	✓							
	MP2721	Operations Management A	COMP	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
4	ER1010	Engineering Analysis	COMP	✓					✓	✓				✓	✓					✓	
	ER1630	Engineering Applications	COMP	✓				✓	✓	✓	✓			✓	✓			✓	✓	✓	
	ER1020	Engineering Design	COMP	✓				✓	✓				✓						✓	✓	

ER1030	Engineering Science	COMP	✓				✓		✓	✓			✓				✓		✓	

Note: *Mapping to other external frameworks, e.g. professional/statutory bodies, will be included within Student Course Handbooks*

19. LEARNING OUTCOMES FOR EXIT AWARDS:

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

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

Learning outcomes for the award of: CertHE

Demonstrate knowledge and understanding of some of the essential facts, concepts, theories and principles of the Mechanical Engineering discipline, and its underpinning science and mathematics.

Some practical engineering competence acquired in specific laboratories; workshops; industry; individual & group project work, design work; and development & use of computer software.

Knowledge and understanding of some scientific, mathematical, and associated engineering principles necessary to underpin activities in Mechanical Engineering.

Creative use of fundamental engineering principles in problem solving, design, explanation and diagnosis.

Create and develop some aspects of economically viable products, processes and systems to meet defined needs.

Practical application of competence in professional engineering practice.

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

Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs.

Developed some transferable skills that will be of value in a wide range of situations, including Problem solving; Communication; and Working with others.

Effective use of some general IT [information technology] facilities and information retrieval skills.

Planning self-learning and improving performance (as starter), as the foundation for lifelong learning/CPD [continuing professional development].

Learning outcomes for the award of: DipHE

Demonstrate knowledge and understanding of the essential facts, concepts, theories and principles of the Mechanical Engineering discipline, and its underpinning science and mathematics.

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

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

The ability to learn new theories, concepts, methods etc in many unfamiliar situations.

Practical Engineering competence acquired in laboratories; workshops; industry; individual & group project work, design work; and development & use of computer software.

Knowledge and understanding of scientific, mathematical, and associated engineering principles necessary to underpin activities in Mechanical Engineering.

Creative use of engineering principles in problem solving, design, explanation and diagnosis.

Create and develop many aspects of economically viable products, processes and systems to meet defined needs.

Specify and develop engineering activities to promote sustainable development in an economic, social and environmental context.

Practical application of competence in professional engineering practice.

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

Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs.

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

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

Developed many transferable skills that will be of value in a wide range of situations, including Problem solving; Communication; and Working with others.

Effective use of many general IT [information technology] facilities and information retrieval skills.

Planning self-learning and improving performance (with confidence), as the foundation for lifelong learning/CPD [continuing professional development].

Monitor and adjust a personal programme of work on an ongoing basis, and to learn independently.

Learning outcomes for the award of: BEng

Demonstrate knowledge and understanding of the essential facts, concepts, theories and principles of the Mechanical Engineering discipline, and its underpinning science and mathematics.

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

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

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

Practical Engineering competence acquired in laboratories; workshops; industry; individual & group project work, design work; and development & use of computer software.

Knowledge and understanding of scientific, mathematical, and associated engineering principles necessary to underpin activities in Mechanical Engineering.

Creative use of engineering principles in problem solving, design, explanation and diagnosis.

Create and develop of economically viable products, processes and systems to meet defined needs.

Specify and develop engineering activities to promote sustainable development in an economic, social and environmental context.

Practical application of competence in professional engineering practice.

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

Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs.

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

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

Developed transferable skills that will be of value in a wide range of situations, including Problem solving; Communication; and Working with others.

Effective use of general IT [information technology] facilities and information retrieval skills.

Planning self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development].

Monitor and adjust a personal programme of work on an ongoing basis, and to learn independently.

Learning outcomes for the award of: BEng (Hons)

Demonstrate knowledge and understanding of the essential facts, concepts, theories and principles of the Mechanical Engineering discipline, and its underpinning science and mathematics.

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

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

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

Practical Engineering competence acquired in laboratories; workshops; industry; individual & group project work, design work; and development & use of computer software.

Knowledge and understanding of scientific, mathematical, and associated engineering principles necessary to underpin activities in Mechanical Engineering.

Creative use of engineering principles in problem solving, design, explanation and diagnosis.

Create and develop of economically viable products, processes and systems to meet defined needs.

Specify and develop engineering activities to promote sustainable development in an economic, social and environmental context.

Practical application of competence in professional engineering practice.

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

Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs.

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

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

Developed transferable skills that will be of value in a wide range of situations, including Problem solving; Communication; and Working with others.

Effective use of general IT [information technology] facilities and information retrieval skills.

Planning self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development].

Monitor and adjust a personal programme of work on an ongoing basis, and to learn independently.

UNIVERSITY OF CENTRAL LANCASHIRE

Programme Specification

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

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

12. Learning Outcomes and Teaching, Learning and Assessment Methods

A. Knowledge and Understanding

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

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

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

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

Teaching and Learning Methods

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

Assessment Methods

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

B. Subject-Specific Skills

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

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

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

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

Teaching and Learning Methods

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

Assessment Methods

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

C. Thinking Skills

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

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

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

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

Teaching and Learning Methods

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

Assessment Methods

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

D. Other skills relevant to employability and personal development

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

Teaching and Learning Methods

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

Assessment Methods

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

13. Programme Structure

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

14. Awards and Credits

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

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

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

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

15. Personal Development Planning

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

16. Admissions Criteria

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

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

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

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

18. Curriculum Skills Map

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