

1. Programme Title(s) and Code(s):

| <i>Programme Title</i> | <i>UCAS Code</i> | <i>GU Code</i> |
|-----------------------------|------------------|----------------|
| BEng Mechanical Engineering | H300 | H300-2200 |

2. Academic Session:

2018-19

3. SCQF Level (see [Scottish Credit and Qualifications Framework Levels](#)):

10

4. Credits:

480

5. Entrance Requirements:

Please refer to the current undergraduate prospectus at: <http://www.gla.ac.uk/undergraduate/prospectus/>

6. ATAS Certificate Requirement (see [Academic Technology Approval Scheme](#)):

ATAS Certificate not required

7. Attendance Type:

Full Time

8. Programme Aims:

Mechanical Engineering is arguably the broadest of main engineering disciplines. Modern mechanical products can incorporate mechanical, electrical and structural elements, requiring professional mechanical engineers to provide design and manufacturing expertise from a wide range of engineering disciplines. The degree programme at the University of Glasgow therefore provides a strong and broad academic engineering education balanced with practical experience to equip graduates with the range of skills a mechanical engineers needs in order to meet the present day challenges in a diverse range of career. Mechanical Engineering plays a vital role in manufacturing and in technological advancement. The Mechanical Engineering degree programme at the

¹ This 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 full advantage is taken of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each course can be found in course handbooks and other programme documentation and online at www.gla.ac.uk/

The accuracy of the information in this document is reviewed periodically by the University and may be checked by the Quality Assurance Agency for Higher Education.

University of Glasgow provides the strong academic education needed to equip the graduate with the broad range of skills a mechanical engineer will need, both today and into the future, to meet the challenges of a diverse range of roles that might be taken, both at home and abroad. The engineering skills will be brought together in the individual industrial project in year 4. The degree partially matches the requirements for accreditation and is accredited by the Institution of Mechanical Engineers. The analytical and problem solving skills of the graduates are well-regarded by employers and researchers.

This degree programme aims to:

- present an integrated in depth multidisciplinary programme of study which will provide the student with knowledge and understanding of Mechanical Engineering;
- provide opportunities for the student to study some specialist topics within the field of Mechanical Engineering;
- provide an opportunity for students to develop transferable problem-solving skills in Mechanical Engineering and individual project work;
- provide technical awareness in appropriate specialist applications of technology in the Mechanical Engineering field;
- develop the student's mathematical rigour, accuracy and numerate skills appropriate for professional engineering;
- present some professional, ethical, economic and management issues relevant to the Mechanical Engineering industry.

9. Intended Learning Outcomes of Programme:

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas.

Knowledge and Understanding:

Graduates will be able to:

- Use their knowledge and understanding of the appropriate mathematical, scientific and computational tools that underpin Mechanical Engineering, to solve analytical, design or theoretical problems in the field of Mechanical Engineering;
- Apply their knowledge and understanding of physical laws, mathematics, numerical analysis and other relevant information in order to model Mechanical Engineering and similar systems;
- Draw on materials from a range of courses and wider reading in Mechanical Engineering principles and in related disciplines in order to solve problems in engineering;
- Apply some business and management techniques that are relevant to Mechanical Engineering and Mechanical Engineers;
- Consider the role of Mechanical Engineers in society and the constraints within which their engineering judgement will be exercised;
- Consider the professional and ethical responsibilities of Mechanical Engineers;
- Consider the national and international role of the Mechanical Engineer and the impact of engineering solutions in a global context.

Skills and Other Attributes:

Graduates will be able to:

Subject-specific/practical skills

- Plan and execute safely a series of experiments in Mechanical Engineering;
- Design, from requirement, market need or specification, a Mechanical Engineering device or system, up to the preliminary design stage, and present this design via a series of poster, written and oral presentations;
- Use laboratory and workshop equipment to generate data from Mechanical Engineering systems with appropriate rigour;
- Analyse experimental results in depth and determine their strength and validity;
- Assess the safety and potential efficacy of a device or system;
- Prepare technical drawings and technical reports;
- Give in depth technical presentations in oral form, as posters or in written form;
- Write up experimental methods, results and conclusions, and carefully and clearly plot experimental or computational results and interpret experimental data by the use of regression, curve fitting and filtering, applying appropriate statistical analysis;
- Use scientific literature effectively and by drawing on their knowledge from lectures and wider reading

- around the subject be able to solve some Mechanical Engineering problems;
- Develop and adjust a work programme in order to conduct a research project;
- Undertake a supervised research project in academia or industry and present the results of this work in a written report and oral presentation to peers and staff;
- Work effectively in both individual and group projects;
- Explain some of the managerial and economic factors facing a professional engineer;
- Document their solutions to engineering problems so that others can follow and validate their work;
- Apply professional engineering practice and judgement in project work;
- Write computer programs and use computational tools and packages, selecting the appropriate “state of the art” tools to solve engineering problems.

Intellectual skills

Graduates will be able to:

- Apply appropriate quantitative mathematical, scientific and engineering tools to the analysis of problems;
- Apply rigour in mathematics;
- Plan, conduct and report a programme of research;
- Analyse and solve engineering problems;
- Design a system, component or process to meet a need;
- Integrate knowledge and understanding of other scientific, mathematical, computational or engineering disciplines in order to support their engineering specialisation;
- Formulate and test hypotheses;
- Evaluate designs, processes and products and make improvements;
- Integrate and evaluate information and data from certain sources;
- Take a holistic approach in solving problems and designing systems, applying professional judgements to balance risks, costs, benefits, safety, reliability, aesthetics and environmental impact.

Transferable/key skills

The skill set of the Mechanical Engineer graduating from the BEng programme will be of use in a wide range of applications because of the multi-disciplinary nature of the subject. Their skills will be, by definition, transferable.

Graduates will be able to:

- Apply problem solving and analytical thinking to a range of problems;
- Demonstrate numeracy and literacy in written reports, project work and examinations;
- Work in a group project environment and contribute effectively to the group project;
- Work on an individual project involving some self-directed research;
- Communicate effectively (in writing, verbally and through drawings);
- Apply mathematical skills (algebra, geometry, modelling, analysis);
- Transfer techniques and solutions from one field of engineering to another and to the Mechanical Design field;
- Use information and communications technology;
- Manage resources and time effectively;
- Learn independently in familiar surroundings with open-mindedness and in the spirit of enquiry;
- Learn effectively for the purpose of continuing professional development throughout their career.

10. Typical Learning and Teaching Approaches:

Staff involved in the degree programme utilise a wide range of teaching methods that they deem the most appropriate for a particular course. These include:

- Lectures;
- External lectures from industry or clinicians;
- Feedback given to students during tutorials;
- Small group and large group tutorial sessions;
- Question and answer sessions during lectures or staff Office Hours;
- Guided reading of texts, journal articles etc., for individual and group projects;
- Completion of web-based exercises or computer based laboratory sessions;
- Laboratory sessions.

11. Typical Assessment Methods:

Assessment Methods to be used are:

- Written examinations (Summative assessment);
- Oral presentations of individual and group work;
- Individual written project report(s) of both individual and group projects;
- Group written project report(s) of group projects;
- Interview of group project manager and assessment of group project minutes;
- Poster presentation of group project work;
- Practical skills will be assessed through laboratory experiments, write-ups, coursework reports, project reports and presentations;
- Experimental, research and design skills will be assessed through laboratory experiments write-ups, coursework reports, project reports and presentations;
- Presentation skills through group presentations and poster presentations.

12. Programme Structure and Features:

BEng H300-2200

BEng Year 1

Compulsory Courses

| Course Code | Course | Credits | Semester |
|-------------|---------------------------|------------|----------|
| ENG1003 | Analogue Electronics 1 | 10 | 1 |
| ENG1015 | Design and Manufacture 1 | 10 | 2 |
| ENG1016 | Mechanical Design 1 | 10 | 1 & 2 |
| ENG1026 | Engineering Skills 1 | 10 | 1 & 2 |
| ENG1033 | Materials 1 | 10 | 1 |
| ENG1062 | Dynamics 1 | 10 | 2 |
| ENG1063 | Engineering Mathematics 1 | 40 | 1 & 2 |
| ENG1065 | Statics 1 | 10 | 1 |
| ENG1066 | Thermodynamics 1 | 10 | 2 |
| | | 120 | |

BEng Year 2

Compulsory Courses

| Course Code | Course | Credits | Semester |
|-------------|----------------------------|------------|----------|
| ENG2015 | Design and Manufacture 2 | 10 | 2 |
| ENG2016 | Mechanical Design 2 | 10 | 2 |
| ENG2039 | Materials 2 | 10 | 2 |
| ENG2045 | Power Electronics 2 | 10 | 1 |
| ENG2053 | Thermodynamics 2 | 10 | 2 |
| ENG2077 | Engineering Skills 2 | 10 | 1&2 |
| ENG2081 | Mechanics of Structures 2A | 10 | 1 |
| ENG2082 | Mechanics of Structures 2B | 10 | 2 |
| ENG2084 | Dynamics 2 | 10 | 2 |
| ENG2085 | Fluid Mechanics 2 | 10 | 1 |
| ENG2086 | Engineering Mathematics 2 | 20 | 1 |
| | | 120 | |

BEng Year 3

Compulsory Courses

| Course Code | Course | Credits | Semester |
|-------------|------------------------------------|---------|----------|
| ENG3015 | Control 3 | 10 | 2 |
| ENG3030 | Fluid Mechanics 3 | 10 | 2 |
| ENG3032 | Heat Transfer 3 | 10 | 2 |
| ENG3034 | Instrumentation and Data Systems 3 | 10 | 2 |
| ENG3035 | Design and Manufacture 3 | 10 | 2 |

| | | | |
|---------|-------------------------------------|------------|---|
| ENG3036 | Simulation of Engineering Systems 3 | 10 | 1 |
| ENG3037 | Mechanics of Solids 3 | 10 | 1 |
| ENG3039 | Dynamics 3 | 10 | 1 |
| ENG3053 | Thermodynamics of Engines 3 | 10 | 1 |
| ENG4025 | Finite Element Analysis 4 | 10 | 1 |
| | | 100 | |

Optional Courses (choose 20 credits)

| Course Code | Course | Credits | Semester |
|-------------|-------------------------|---------|----------|
| COMPSCI3005 | Software Engineering M3 | 10 | 2 |
| ENG3017 | Mechanical Design 3 | 20 | 1 & 2 |
| ENG3041 | Power Engineering 3 | 10 | 2 |

BEng Year 4

Compulsory Courses

| Course Code | Course | Credits | Semester |
|-------------|-------------------------|-----------|----------|
| ENG4110P | Individual Project 4 | 30 | 1 & 2 |
| MGT5068 | Professional Practice 5 | 20 | 2 |
| | | 50 | |

Optional Courses (choose 70 credits)

| Course Code | Course | Credits | Semester |
|-------------|---|---------|----------|
| ENG4004 | Materials Engineering 4 | 10 | 2 |
| ENG4042 | Control 4 | 20 | 1 |
| ENG4079 | Industrial Aerodynamics 4 | 10 | 2 |
| ENG4088 | Lasers and Electro-Optic Systems 4 | 20 | 1 |
| ENG4094 | Mechanics of Solids 4 | 20 | 1 |
| ENG4098 | Microelectronics in Consumer Products 4 | 10 | 1 |
| ENG4118 | Robotics 4 | 20 | 2 |
| ENG4137 | Vibration 4 | 20 | 2 |
| ENG4173 | Renewable Energy 4 | 10 | 1 |
| ENG4179 | Advanced Thermal Engineering 4 | 20 | 1 |
| ENG4186 | Mechanical Design 4 | 20 | 1 & 2 |
| LAW1011 | Elements of Law for Engineers | 10 | 2 |

Regulations

This programme will be governed by the relevant regulations published in the University Calendar. These regulations include the requirements in relation to:

- (a) Award of the degree
- (b) Progress
- (c) Early exit awards

<http://www.gla.ac.uk/services/senateoffice/calendar/>

13. Programme Accredited By:

Accredited by the Institution of Mechanical Engineers (IMechE) to CEng level with further learning required.

14. Location(s):

Glasgow

15. College:

College of Science and Engineering

16. Lead School/Institute:

Engineering [REG30300000]

17. Is this programme collaborative with another institution:

No

18. Awarding Institution(s):

University of Glasgow

19. Teaching Institution(s):

University of Glasgow

20. Language of Instruction:

English

21. Language of Assessment:

English

22. Relevant QAA Subject Benchmark Statements (see [Quality Assurance Agency for Higher Education](#)) and Other External or Internal Reference Points:

This Programme Specification is informed by the QAA Benchmark Statement for Engineering

<http://www.qaa.ac.uk/en/Publications/Documents/Subject-benchmark-statement-Engineering-.pdf>

It is also informed by the Engineering Council Publication "UK Standard for Professional Engineering Competence (UK-SPEC)"

[http://www.engc.org.uk/engcdocuments/internet/Website/UK-SPEC third edition \(1\).pdf](http://www.engc.org.uk/engcdocuments/internet/Website/UK-SPEC%20third%20edition%20(1).pdf)

and the requirements of the Institution of Mechanical Engineers (<http://www.imeche.org.uk/>)

23. Additional Relevant Information (if applicable):

Support for students is provided by the Postgraduate/Undergraduate Adviser(s) of Studies supported by University resources such LEADS (www.gla.ac.uk/myglasgow/leads/), Counselling & Psychological Services (www.gla.ac.uk/services/counselling/), the Disability Service (www.gla.ac.uk/services/studentdisability/) and the Careers Service (www.gla.ac.uk/services/careers/).

24. Online Learning:

No

25. Date of approval:

07/08/2018