Programme Specification[1]

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

Programme Title	*UCAS Code*	*GU Code*
MEng Mechanical Design Engineering		HHJ7-2204

2. Academic Session:

2018-19

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

11

4. Credits:

600

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:

One of the many challenges facing industry, academia and the professional engineering institutions is the education and training of engineers capable of exploiting current and future technology to produce competitive and innovative products, within a commercially demanding environment, for the satisfaction of society's needs and desires, and for the creation of the nation's wealth. The Mechanical Design Engineering degree programme seeks to meet this challenge by producing engineers with the skills and aptitude for the design of products, and with particular strengths in mechanical design. Function and performance issues of engineering products are emphasised. The programme aims to develop the required blend of knowledge and skills by treating design and

[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.

manufacture as basic activities of engineering, and also as the main vehicle for integration of the course elements. The engineering skills will be brought together via studio-based individual and group design projects with individual industrial design project in year 5. The degree matches the requirements for accreditation and is accredited by the Institution of Mechanical Engineers and Institute of Engineering Designers. The analytical and problem solving skills of the graduates are well-regarded by employers and researchers.

The MEng programme is an integrated Masters programme in Mechanical Design Engineering designed as a preparation for professional practice. It provides an extended and enhanced programme of study beyond the BEng and is not simply a one year extension to the BEng. It is designed for the more able student. The programme of study is both broader and deeper than the corresponding BEng.

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 Design Engineering;
- provide opportunities for the student to study in depth a choice of specialist topics within the field of Mechanical Design Engineering;
- provide an opportunity for students to develop transferable problem solving skills in Mechanical Design Engineering in group and large scale individual project work;
- provide technical awareness in appropriate specialist applications of technology in the Mechanical Design Engineering field;
- develop the student's mathematical rigour, accuracy and numerate skills appropriate for professional engineering;
- present and develop professional, ethical, economic and management issues relevant to the Mechanical Design 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 Design Engineering, to solve, in depth, analytical, design or theoretical problems in the field of Mechanical Design Engineering;
- Apply their knowledge and understanding of physical laws, mathematics, numerical analysis and other relevant information in order to model Mechanical Design Engineering and similar systems;
- Draw on materials from a range of courses and wider reading in Mechanical Design Engineering principles and in related disciplines in order to solve problems in Mechanical Design Engineering including demonstrating depth and breadth to their learning;
- Apply business and management techniques that are relevant to Mechanical Design Engineering and Mechanical Design Engineers;
- Explain the role of Mechanical Design Engineers in society and the constraints within which their engineering judgement will be exercised;
- Explain the professional and ethical responsibilities of Mechanical Design Engineers;
- Consider the national and international role of the Mechanical Design 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 Design Engineering;
- Design, from requirement, market need or specification, a Mechanical Design Engineering device or system, up to the preliminary design stage, and present this design via a series of poster, written and oral presentations from both group and individual work;
- Use laboratory and workshop equipment to generate data from Mechanical Design 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 Mechanical Design Engineering problems;
- Develop and update a research plan and adjust a work programme in order to conduct a major research project in academia or industry;
- Undertake a large scale 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 in depth the managerial and economic factors facing a professional engineer;
- Document their solutions to Mechanical Design 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 Mechanical Design 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 original research;
- Analyse and solve engineering problems;
- Design a Mechanical Design Engineering system, component or process to meet a need;
- Be creative in the solution of problems and in the development of designs;
- Integrate knowledge and understanding of other scientific, mathematical, computational or engineering disciplines in order to support their engineering specialisation;
- Formulate and test hypotheses modifying the hypotheses depending on the data obtained;
- Evaluate designs, processes and products and make improvements;
- Integrate and evaluate information and data from a variety of 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 Design Engineer graduating from the MEng 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 in depth problem solving and analytical thinking to a diverse range of problems;
- Use appropriate multi-disciplinary skills to solve Mechanical Design Engineering problems, combining the breadth of knowledge gained through the degree;
- Demonstrate numeracy and literacy in written reports, project work and examinations;
- Work in a group project environment and contribute effectively to the group project, including working as a member of an interdisciplinary team;
- Work on an individual project involving 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;
- Exercise team leadership;
- Learn independently in familiar and unfamiliar surroundings with open-mindedness and in the spirit of critical enquiry;
- Learn effectively for the purpose of continuing professional development and in a wider context 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:

MEng HHJ7-2204

MEng 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	

MEng 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
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	

MEng Year 3

Compulsory Courses

Course Code	Course	Credits	Semester
COMPSCI3005	Software Engineering M3	10	2
ENG3015	Control 3	10	2
ENG3017	Mechanical Design 3	20	1 & 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
ENG3035	Dynamics 3	10	1
ENG4025	Finite Element Analysis 4	10	1
		120	

MEng Year 4

Compulsory Courses

Course Code	Course	Credits	Semester
ENG4085	Integrated System Design Project 4	20	1 & 2
ENG4186	Mechanical Design 4	20	1 & 2
		40	

Optional Courses (choose 80 credits)

Course Code	Course	Credits	Semester
ENG4004	Materials Engineering 4	10	2
ENG4042	Control 4	20	1
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
LAW1011	Elements of Law for Engineers	10	2

MEng Year 5

Compulsory Courses

Course Code	Course	Credits	Semester
ENG5041P	Individual Project 5	60	1
MGT5068	Professional Practice 5	20	2
		80	

Optional Courses (choose 40 credits)

Course Code	Course	Credits	Semester
ENG5009	Robust Control 5	10	2
ENG5017	Autonomous Vehicle Guidance Systems	10	2
ENG5227	Structures under External Loads	10	2
ENG5299	Dynamics 5	10	2
ENG5300	Materials Engineering 5	10	2
ENG5302	Ultrasound Technology and Applications	10	2
ENG5303	Advanced Thermal Engineering 5	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) and the Institution of Engineering Designers (IED) to CEng level.

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 and the requirements of the Institution of Mechanical Engineers (http://www.imeche.org.uk/) and the Institution of Engineering Designers (http://www.ied.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