

GLASGOW CALEDONIAN UNIVERSITY

School of Computing, Engineering and Built Environment

PgC/PgD/MSc

In

MECHANICAL ENGINEERING (DESIGN)

MECHANICAL ENGINEERING (MANUFACTURE)

Programme Specification Pro-forma (PSP)

1.	GENERAL INFORMATION	
1.	Programme Title:	Mechanical Engineering (Design) Mechanical Engineering (Manufacture)
2.	Final Award:	Master of Science Mechanical Engineering (Design) Mechanical Engineering (Manufacture)
3.	Exit Awards:	Postgraduate Certificate, Postgraduate Diploma
4.	Awarding Body:	Glasgow Caledonian University
5.	Period of Approval:	September 2022 – August 2027
6.	School:	School of Computing, Engineering and Built Environment
7.	Host Department:	Mechanical Engineering
8.	UCAS Code:	N/A
9.	PSB Involvement:	Institution of Mechanical Engineers
10.	Place of Delivery:	Glasgow Caledonian University
11.	Subject Benchmark Statement:	QAA Subject Benchmark Statement:
12.	Dates of PSP	October 2022
	Preparation/Revision:	June 2024

2. EDUCATIONAL AIMS OF THE PROGRAMME

The programmes build on the MEng (Hons) in Mechanical Systems Engineering and the MEng (Hons) in Computer-Aided Mechanical Engineering taught at GCU. The postgraduate programmes will therefore allow the School to offer an accredited route to membership of the Institution of Mechanical Engineers (IMechE) and to Chartered Engineer status (CEng).

In addition the UK-SPEC requirements also open potential routes to those honours graduates from programmes which do not hold accreditation with the IMechE. Prospective honours graduates following this path will have the opportunity to work towards the attainment of CEng status through completion of this programme supplemented with further study based on individual profile as appropriate.

The academic aims for the Postgraduate Diploma and Master of Science are fundamentally similar. However, the Master of Science provides the student with the opportunity to develop a range of additional research skills through completion of a major mechanical engineering thesis.

The educational aims of the Postgraduate Diploma are to give students an opportunity to select from the Masters programme modules, a package of learning (4 taught modules), providing elements of technical deepening/broadening and non-technical skills to meet individual requirements.

The Postgraduate Diploma and Master of Science effectively forms the link between the BEng (Hons) degree (which is heavily based on academic theory and application), and the more diversified skills base (both in terms of breadth and depth) which is expected of a practicing engineer.

The programmes also form valuable and relevant programmes of study for students from a wide range of backgrounds wishing to complete postgraduate study within the discipline of mechanical engineering in a design or a manufacture environment, through flexible full-time and part-time study modes and as part of a Continuing Professional Development (CPD) programme.

The taught component in the programme will build on the knowledge gained from the undergraduate BEng (Hons) degree (or equivalent programmes) to complete the academic formation required for a prospective Chartered Engineer. In addition to this, the structure and content will support the students' progress towards achieving the IMechE professional objectives through gaining the appropriate interpersonal skills, and higher level skills in solution development (broadening and deepening), using new and existing technologies, innovation, creativity and leadership.

The general educational aims of the programme include the following:

- providing the students with the knowledge and skills to equip them for a career as a chartered engineer within the mechanical engineering profession in a design or a manufacture environment;
- developing the students' competence in a range of appropriate specialist areas;
- developing the critical and analytical powers of the student in relation to the analysis of differing views on emerging concepts and to enable them to evaluate these against a background of a constantly changing industry;
- providing the student with the skills to adapt and respond positively to change;
- enhancing critical, analytical problem-based learning skills and the transferable skills to further develop the students' employability as a mechanical engineer in a design or manufacture environment;
- enhancing the development of the students' managerial, communication and information technology skills;
- developing the skills and knowledge to conduct projects efficiently, ethically and safely.

In addition to the above, the main aims of the Master of Science Project component of the programme are to:

- expand the student's expertise by providing the opportunity to undertake a significant piece of independent work, taking a holistic view of the subject area.

4. PROGRAMME STRUCTURES AND REQUIREMENTS, LEVELS, MODULES, CREDITS AND AWARDS

Preamble

The structure of the proposed MSc is consistent with most other equivalent postgraduate degrees offered at GCU. The first part of the degree is comprised of taught modules set at Masters level SHE M (SQCF 11) and allocated 15 credit points each and the latter part of the degree is comprised of a Masters level project worth 60 credit points. Exit awards will be made as follows:

- Postgraduate Certificate for passes in any 4 taught modules. **60 credits at SQCF 11**
- Postgraduate Diploma in Mechanical Engineering (Design) or Mechanical Engineering (Manufacture) for passes in all 7 taught modules from corresponding pathway. **120 credits at SQCF 11**
- MSc in Mechanical Engineering (Design) or Mechanical Engineering (Manufacture) for passes in all 7 taught modules from corresponding pathway and a pass in the Project module. **180 credits at SQCF 11**

Selection of Taught Modules

As part of the requirement for the award of Postgraduate Diploma and Master of Science in Mechanical Engineering (Design) or Mechanical Engineering (Manufacture), a student must achieve passes in all taught modules. The taught modules are as shown in Table 4.1 and are selected as follows:

- 5 core modules (including a double credit module) must be selected for both study options
- 2 modules in the design option must be selected for 'Design' award
- 2 modules in the manufacture option must be selected for 'Manufacture' award

MSc/PgD/PgC in Mechanical Engineering (DESIGN)

Table 4.1 (SHE Level M Modules)

SCQF Level 11

Module Code	Module Title	Credit
MMH323674	Professional Practice	15
MMN223676	Strategy and Innovation	15
MMH323561	Applied Thermofluids & CFD	15
MMH226690	Advanced Engineering Mechanics	15
MMH223558	Energy Audit & Energy Asset Management	15
MMH630508	Sustainable Materials & Manufacturing Processes	15
MMH130694	Advanced Computer-Aided Engineering	30
MMH306621	Project (Mechanical Engineering)	60
	Exit Award – Master of Science (MSc) Degree in Mechanical Engineering (Design)	180

Exit with Postgraduate Certificate (PgC) in Mechanical Engineering with 60 taught credits

Exit with Postgraduate Diploma (PgD) in Mechanical Engineering (Design) with 120 taught credits

Exit with Master of Science (MSc) Degree in Mechanical Engineering (Design) with 180 credits including Project

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SCQF Level 11

Module Code	Module Title	Credit
MMH323674	Professional Practice	15
MMN223676	Strategy and Innovation	15
MMH723583	Maintenance Management	15
MMH723672	Manufacturing Management	15
MMH223558	Energy Audit & Energy Asset Management	15
MMH630508	Sustainable Materials & Manufacturing Processes	15
MMH130694	Advanced Computer-Aided Engineering	30
MMH306621	Project (Mechanical Engineering)	60
	Exit Award – Master of Science (MSc) Degree in Mechanical Engineering (Manufacture)	180

Exit with Postgraduate Certificate (PgC) in Mechanical Engineering with 60 taught credits

Exit with Postgraduate Diploma (PgD) in Mechanical Engineering (Manufacture) with 120 taught credits

Exit with Master of Science (MSc) Degree in Mechanical Engineering (Manufacture) with 180 credits including Project

Information about Professional Accreditations and/or specific modules required for each exit point and award listed above.

The following tables map the GCU Learning Outcomes for the programme listed in Section 3 with the AHEP4 Learning Outcomes listed in Tables PSMAP1 and PSMAP2 on page19

GCU	Knowledge and Understanding	Mapping to AHEP4
	Students will have a knowledge and understanding of:	
A1	Knowledge and understanding of scientific and mathematical principles and methodology necessary to underpin their education in their engineering discipline and to enable them to apply mathematical methods, tools and notations proficiently in the analysis and solution of engineering problems.	M1, M2
A2	The engineering principles, concepts, and theories relevant to their own engineering discipline and other engineering disciplines and an awareness of developing technologies related to their own engineering specialism.	M2, M4
A3	The analytical methods, modelling techniques, computer models and software tools relevant to their engineering discipline in order to solve engineering problems.	M3
A4	Structured design processes and methodologies and a systems approach to engineering problems and product design.	M5
A5	The commercial and economic context of engineering activity and the management techniques, which may be used to achieve engineering objectives within that context.	M5
A6	The framework of relevant legal requirements, codes of practice, quality issues and industrial standards governing engineering activity and product design.	M5
A7	The multi-disciplinary nature of product engineering, the need for a high level of professional and ethical conduct in engineering practice, and, the requirement for engineering activities to promote sustainable development.	M7

	Professional and Practical Skills	Mapping to AHEP4
	Students will be able to:	
B1	Demonstrate proficiency in the use of specialist equipment, development tools, materials and processes employed in design and manufacturing systems.	M5
B2	Exercise safe working practices and demonstrate proficiency in workshop and laboratory skills.	M7
B3	Use and manage a structured design process in the creation and development of an economically viable product.	M5
B4	Demonstrate a critical appreciation of the complexity and interaction of managerial, technical and environmental issues in the modern workplace.	M7, M16
B5	Manage sustainable and ethical product design within companies and across supply chains.	M5, M17
B6	Apply project management and business practices appropriately.	M7
B7	Operate and act responsibly, adhere to professional codes of practice and industrial standards, taking account of the need to progress environmental, social and economic outcomes simultaneously.	M5, M7
B8	Specialist knowledge in design and manufacturing engineering and its application.	M5, M3
B9	Critical thinking and problem solving applied to design and manufacturing engineering.	M1, M5
B10	Critical analysis.	M1
B11	Effective information retrieval and research skills.	M4
B12	Commercial awareness.	M5

GCU	Generic cognitive skills	Mapping to AHEP4
	Students will be able to:	
C1	Apply mathematical methods and scientific and engineering principles proficiently in the analysis, synthesis, performance assessment, critical appraisal and evaluation of design and manufacturing systems.	M1, M5
C2	Select and apply appropriate analytical and computer based methods for modeling and analysing engineering problems.	M3
C3	Select and apply appropriate computer software tools to the synthesis, implementation, evaluation, analysis and solution of electronic problems and systems.	M3
C4	Investigate and define a problem and identify constraints including environmental and sustainability, health and safety and risk assessment issues.	M7
C5	Apply a systems approach to the analysis and solution of engineering problems and the design of electronic products.	M5
C6	Use imagination, creativity and innovation, through synthesis of ideas, to provide products and services whilst exercising professional judgment and methods to resolve dilemmas arising from ethical, sustainability and financial constraints.	M5, M7
C7	Apply management techniques to achieve engineering objectives within a commercial and economic context.	M5, M16

GCU	Communication, numeracy and ICT skills	Mapping to AHEP 4
D1	Communication skills; written, oral and listening.	M17
D2	Numeracy as applied to the solution of engineering problems.	M7
D3	Computer literacy as applied to the solution of engineering problems.	M3
D4	Presentation skills.	M17

GCU	Autonomy, accountability and working with others.	Mapping to AHEP4
E1	Self-confidence, self-discipline & self-reliance (independent working).	M16,
E2	Awareness of strengths and weaknesses.	M16
E3	Creativity, innovation & independent thinking.	M5, M16
E4	Appreciating and desiring the need for continuing professional development.	M16
E5	Reliability, integrity, honesty and ethical awareness	M5, M16
E6	Entrepreneurial, independence and risk-taking.	M7
E7	Ability to prioritise tasks and time management (organising and planning work).	M16
E8	Interpersonal skills, team working and leadership.	M16

8. ASSESSMENT REGULATIONS

Students should expect to complete their programme of study under the [Regulations](#) that were in place at the commencement of their studies on that programme, unless proposed changes to University Regulations are advantageous to students.