

(DOC SEBE/MEEEUGMECH/PB2015/1/04)



**School of Engineering and Built Environment**

**MEng / BEng(HONS)**

**IN**

**COMPUTER AIDED MECHANICAL ENGINEERING  
MECHANICAL-ELECTRONIC SYSTEMS  
ENGINEERING**

**PROGRAMME SPECIFICATION**

**April 2015**

## 1. GENERAL INFORMATION

<b>Programme Titles:</b>	MEng / BEng(Hons) Computer Aided Mechanical Engineering (CAME) Mechanical-Electronic Systems Engineering (MESE)
<b>Final Awards:</b>	MEng Computer Aided Mechanical Engineering MEng Mechanical-Electronic Systems Engineering
<b>Exit Awards:</b>	BEng (Hons) Computer Aided Mechanical Engineering
	BEng (Hons) Mechanical-Electronic Systems Engineering
	BEng Computer Aided Mechanical Engineering BEng Mechanical-Electronic Systems Engineering
	DipHE in Mechanical Engineering CertHE in Engineering
<b>Awarding Body:</b>	Glasgow Caledonian University
<b>Approval Date:</b>	April 2015
<b>Faculty/School:</b>	School of Engineering and Built Environment
<b>Host Department:</b>	Department of Engineering
<b>UCAS Code:</b>	MEng CAME (H132), BEng(Hon) CAME (H131) MEng MESE (H360), BEng(Hon) MESE (H361)
<b>PSB Involvement:</b>	Institution of Mechanical Engineers (IMechE)
<b>Place of Delivery:</b>	N/A
<b>Subject Benchmark Statement:</b>	QAA Benchmarking Statements for Engineering
<b>Dates of PS Preparation/Revision:</b>	<b>April 2015</b>

## **2 EDUCATIONAL AIMS OF THE PROGRAMME**

### **2.1 Programme Philosophy**

To produce multi-disciplinary professional engineers with a bias toward mechanical engineering, who have the required knowledge and understanding of specific mechanical engineering principles, integrated with an understanding of general engineering, manufacturing and business, reinforced with good personal, inter-personal and team-working skills, to enable them to perform effectively in any appropriate situation.

### **2.2 General Aims of the Programme**

- To create in the student an ability to think clearly and logically.
- To equip the student with a range of analytical methods for use in engineering applications.
- To provide such principles and practice as will allow the student to acquire an understanding of engineering to cope adequately with technological change.
- To develop the students' ability to contribute to the specification, design, testing, commissioning, modification, manufacture and maintenance of engineering artefacts and systems.
- To develop fully the student's abilities in the use of computer-aided engineering and relevant aspects of information technology.
- To make the student aware of the ethics, social, economic, and environmental impact of engineering.
- To extend, enhance and improve the judgement of the student in decision making by extension of analytical, creative and intellectual skills.
- To integrate the expertise of staff gained from research, consultancy and scholarly activity into the programme materials where appropriate.
- To develop the students' interpersonal skills to enable effective communication and team working
- To provide a broad education by an integrated study of vocational and academic disciplines.

**2.3 BEng(Honours) Graduates will gain the following specialist knowledge, abilities and skills.**

- A knowledge of the range and use of analytical methods available for the design, specification, and monitoring of mechanical engineering systems.
- The ability to analyse and evaluate the performance and operational characteristics of a range of mechanical engineering equipment.
- A strong theoretical understanding in mechanical engineering, enabling the student to respond positively to technological development and innovation.
- Ability to utilise modern advanced computer-aided design, simulation and analysis techniques in the solution of engineering problems in a mechanical engineering environment.
- An awareness and appreciation of the practical issues involved in the design, specification, maintenance, commissioning and manufacture of mechanical equipment and associated systems.
- An awareness of the social, regulatory and environmental impact of engineering solutions to the production, distribution, and utilisation of mechanical engineering equipment.
- Knowledge of the latest developments in the subject area through the inclusion of research material where appropriate based on staff research, consultancy and other scholarly activity.

**2.4 MEng Graduates will have in addition to the BEng.**

- The ability to integrate their knowledge and understanding of mathematics, science, computer-based methods, design, the economic, social and environmental context, and engineering practice to solve a substantial range of engineering problems, some of a complex nature.
- Acquired much of this ability through involvement in individual and group projects, and
- Greater degree of industrial involvement than those in Bachelor's degree programmes.

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

**4.1 FULL-TIME STUDY MODE**

**MEng/BEng(H)/BEng:**

**MECHANICAL-ELECTRONIC SYSTEMS ENGINEERING**

**COMPUTER AIDED MECHANICAL ENGINEERING**

**LEVEL 1 AND LEVEL 2 ARE COMMON FOR BOTH PROGRAMMES:**

<b>Year 1</b>				
<b>Module Code</b>	<b>Module Title</b>	<b>Level</b>	<b>Credits</b>	<b>Semester</b>
M1H323564	Mathematics 1A	1	10	A
M1H321924	Mechanical Principles A	1	10	A
M1H623526	Electrical Principles and Circuit Theory	1	20	A
M1H623547	Engineering Applications	1	20	A / B
M1H106590	Principles of Programmable Systems A	1	10	A
M1H623617	Integrated Engineering Studies 1	1	20	B
M1H121922	Engineering Materials	1	10	B
M1H323565	Mathematics 1B	1	10	B
M1H321923	Mechanical Principles B	1	10	B
<b>Exit with Certificate of Higher Education (CertHE) in Engineering</b>				
<b>Year 2</b>				
<b>Module Code</b>	<b>Module Title</b>	<b>Level</b>	<b>Credits</b>	<b>Semester</b>
M2H323566	Mathematics 2A	2	10	A
M2H323512	Thermodynamics & Fluid Mechanics	2	20	A
M2H720058	Manufacture & Materials 2	2	20	A
M2H623625	Integrated Engineering Studies 2	2	10	A
M2H623552	Electrical Systems	2	10	B
M2H622325	Control and Instrumentation Systems	2	20	B
M2H323567	Mathematics 2B	2	10	B
M2H721926	Engineering Design and Analysis 2	2	20	B
<b>Exit with Diploma of Higher Education (DipHE) in Mechanical Engineering</b>				

**MEng/BEng(H)/BEng:**

**COMPUTER AIDED MECHANICAL ENGINEERING**

**LEVELS 3 AND 4:**

<b>Year 3</b>				
<b>Module Code</b>	<b>Module Title</b>	<b>Level</b>	<b>Credits</b>	<b>Semester</b>
MHH113285	Computer Aided Engineering	4	20	A
M3H721406	Manufacture & Materials 3	3	20	A
M3H120320	Engineering Design & Analysis 3	3	20	A
<b>EITHER</b>				
M3J923150	Energy Conversion Technologies	3	20	B
M3H623554	Integrated Engineering Studies 3	3	20	B
M3H723623	Engineering Operations Management	3	20	B
<b>OR</b>				
	European Project Semester <sup>1</sup>	3	60	B
<b>Exit with BEng Degree in Computer Aided Mechanical Engineering</b>				
<b>YEAR 4</b>	<b>SANDWICH PROGRAMME (OPTIONAL for those students not previously on placement in Semester B)</b>			
<b>Module Code</b>	<b>Module Title</b>	<b>Level</b>	<b>Credits</b>	<b>Semester</b>
M3H706413	Diploma in Industrial Practice	3	60	36 weeks
M3H323616	European Erasmus Exchange	3	60	A/B
<b>Year 4</b>	<b>Full-Time Programme</b>			
<b>Year 5</b>	<b>Sandwich Programme</b>			
<b>Module Code</b>	<b>Module Title</b>	<b>Level</b>	<b>Credits</b>	<b>Semester</b>
MHH623549	Project	4	40	A / B
MHH723509	Finite Element Analysis	4	10	A
MHH122359	Engineering Design & Analysis 4	4	20	A
MHH120588	Simulation for Manufacturing	4	10	A
MHH123523	Computer Aided Design 2	4	20	B
<b>OPTIONS (CHOOSE 1 FROM 3)</b>				
MHH323630	Design Process, Assembly and Manufacture	4	20	B
MHH723624	Manufacturing Systems	4	20	B
MHH323524	Renewable Energy Equipment Design	4	20	B
<b>Exit with BEng (Honours) Degree in Computer Aided Mechanical Engineering.</b>				

**Notes**

1. Students who elect to undertake the European Project Semester in Semester B of third year will not have the suitable underpinning to take the Renewable Energy Equipment Design option in fourth year.

MEng/BEng(H)/BSc(H)/BEng:

## COMPUTER AIDED MECHANICAL ENGINEERING

### LEVEL 5:

Year 5/6		MEng Programme		
Module Code	Module Title	Level	Credits	Semester
MMH722850	MEng Team Project.	5	45	A(15) & B(30)
MMN223676	Strategy & Innovation	5	15	A
MMH323561	Applied Thermofluids & CFD	5	15	A
MMH723672	Manufacturing Management	5	15	A
MMH123668	Advanced Computer Aided Engineering	5	30	B
<b>Exit with MEng Degree in Computer Aided Mechanical Engineering.</b>				

**MEng/BEng(H)/BEng:  
Mechanical Electronic Systems Engineering**

**LEVELS 3 AND 4:**

<b>Year 3</b>				
<b>Module Code</b>	<b>Module Title</b>	<b>Level</b>	<b>Credit</b>	<b>Trimester</b>
M3H606414	Control Engineering 3	3	20	A
M3H721406	Manufacture & Materials 3	3	20	A
M3H120320	Engineering Design & Analysis 3	3	20	A
	<b>EITHER</b>			
M3J923150	Energy Conversion Technologies	3	20	B
M3H623554	Integrated Engineering Studies 3	3	20	B
M3H723623	Engineering Operations Management	3	20	B
	<b>OR</b>			
	European Project Semester	3	60	B
<b>Year 3+ Optional Year in Industry/Erasmus Exchange</b>				
<b>Module Code</b>	<b>Module Title</b>	<b>Level</b>	<b>Credits</b>	<b>Trimester</b>
M3H721925	Industrial Practice	3	60	A / B
M3H323616	Erasmus European Exchange	3	60	A / B
<b>Exit with BEng (unclassified) Degree in Mechanical-Electronic Systems Engineering</b>				
<b>Year 4 Full-Time Programme</b>				
<b>Module Code</b>	<b>Module Title</b>	<b>Level</b>	<b>Credits</b>	<b>Trimester</b>
MHH623549	Project	4	40	A / B
MHH113285	Computer-Aided Engineering	4	20	A
MHH122359	Engineering Design & Analysis 4	4	20	A
	<b>OPTIONS (CHOOSE 2 FROM 3)</b>			
MHH622747	Control Engineering 4	4	20	B
MHH323630	Design Process, Assembly and Manufacture	4	20	B
MHH323524	Renewable Energy Equipment Design	4	20	B
<b>Exit with BEng (Honours) Degree in Mechanical-Electronic Systems Engineering</b>				



<b>Year 5</b>		<b>Full-Time Programme</b>		
<b>Module Code</b>	<b>Module Title</b>	<b>Level</b>	<b>Credits</b>	<b>Trimester</b>
MMH722850	MEng Group Project	5	45	A / B
MMN223676	Strategy and Innovation	5	15	A
MMH323561	Applied Thermofluids & CFD	5	15	A
MMH223669	Advanced Eng Mechanics - Structures	5	15	A
MMH323622	Advanced Eng Mechanics - Dynamics	5	15	B
	<b>OPTIONS (CHOOSE 1 FROM 2)</b>			
MMH120620	Control Systems	5	15	B
MMH613156	Condition Monitoring	5	15	B
<b>Exit with MEng Degree in Mechanical-Electronic Systems Engineering</b>				

#### 4.1 PART-TIME STUDY MODE

*Assumes entry with Advanced Standing equivalent to 120 Credits at Level 1*

Module No	Module	Level	Semester	Credits
	<b>FIRST YEAR (P/T)</b>			
M2H720058	Manufacture & Materials 2	2	20	A
M2H323512	Thermodynamics & Fluid Mechanics	2	20	A
M1h323563	Engineering Mathematics	2	10	B
M2H623552	Electrical Systems	2	10	B
M2H721926	Engineering Design and Analysis 2	2	20	B
	<b>Exit with Certificate of Higher Education in Engineering</b>			
	<b>SECOND YEAR (P/T)<sup>1</sup></b>			
M2H323566	Mathematics 2A	2	10	A
M3H721406	Manufacture & Materials 3	3	20	A
M2H622325	Control and Instrumentation Systems	2	20	B
M3H723623	Engineering Operations Management	3	20	B
M2H323567	Mathematics 2B	2	10	B
	<b>Exit with Diploma of Higher Education in Mechanical Engineering</b>			
	<b>THIRD YEAR (P/T)</b>			
MHH113285	Computer Aided Engineering (CAME) OR	4	20	A
M3H606414	Control Engineering 3 (MESE)	3	20	A
M3H120320	Engineering Design & Analysis 3	3	20	A
M3J923150	Energy Conversion Technologies	3	20	B
M3H623554	Integrated Engineering Studies 3	3	20	B
	<b>Exit with BEng in either Mechanical Electronic Systems Engineering or Computer Aided Mechanical Engineering</b>			
	<b>FOURTH YEAR (P/T)</b>			
MHH623549	Project (CEng route option) Work-based project	4	40	A/B
MHH723509M	Finite Element Analysis (CAME)	4	10	A
HH120588	Simulation for Manufacturing (CAME)		10	
	OR			
MHH113285	Computer Aided Engineering (MESE)		20	
MHH120326	Engineering Design & Analysis 4	4	20	A
MHH123523	Computer Aided Design 2 (CAME)	4	20	B
	<b>OPTIONS (CAME)<sup>2</sup></b>			
MHH323630	Design Process, Assembly and Manufacture	4	20	B
MHH723624	Manufacturing Systems	4	20	B
MHH323524	Renewable Energy Equipment Design	4	20	B
	<b>OPTIONS (MESE)<sup>3</sup></b>			
MHH622747	Control Engineering 4	4	20	B
MHH323630	Design Process, Assembly and Manufacture	4	20	B
MHH323524	Renewable Energy Equipment Design	4	20	B
	<b>Exit with BEng (Hons) in either Mechanical Electronic Systems Engineering or Computer Aided Mechanical Engineering<sup>4</sup></b>			

#### Notes

1. The second year of the part-time programme has an uneven split of credits with 30 credits in Trimester A and 50 credits in Trimester B.

2. **Choose 1 from 3**
3. **Choose 2 from 3**
4. **The Fifth year of the MEng programme is specifically designed for full-time undergraduate students. It is the intention, by design, that Part-time students would exit the BEng(Hons) programme and enrol on the equivalent professional body accredited MSc programme by part-time mode of study to enable completion of the Academic Requirements for CEng registration under UK\_SPEC.**

## **8 REGULATION OF ASSESSMENTS**

The Glasgow Caledonian University Undergraduate Assessment Regulations can be accessed from:

<http://www.gcu.ac.uk/media/gcalwebv2/theuniversity/gag/gaqfiles/assessmentregulations/University%20Assessment%20%20Regulations%202014-15%20Undergraduate.pdf>

The Glasgow Caledonian University Undergraduate Assessment Regulations apply to this programme with exceptions for the Honours Classification Scheme and anticipated updates to the Integrated Masters Progression and Classification Scheme.

### **1) Classification of Honours Award as described in Section 19.7.1**

#### **8.1 Programme Specific Regulations for the Classification of Honours**

##### **8.1.1 Award of Honours statement to replace University Regulations Section 19.7.1**

The award of Honours will normally be made on the basis of an overall amalgamated aggregate of a student's performance in the modules studied at Level 3 and Level 4 of their programme irrespective of the actual level of any particular module studied at these levels.

This final overall amalgamated aggregate will be determined from:

i) a 25% weighting obtained from an aggregate of the marks for the modules studied at Level 3 of their programme.

and

ii) a 75% weighting obtained from an aggregate of the marks for the modules studied at Level 4 of their programme.

In the case of the amalgamated aggregate falling within the profiling boundaries defined in Section 19.8 the profiling will be based on a calculation set of the Level 4 results only and will follow the model criteria for profiling as defined in Section 19.8.3.

### **2) Progression to Final Year of Integrated Masters and Classification Scheme**

#### **8.2 Programme Specific Regulations for Progression to Integrated Masters and Classification Scheme.**

Incorporation of specific amendments to the Glasgow Caledonian University Undergraduate Assessment Regulations to allow clarification of criteria for Progression to, and Classification of, Integrated Masters. This proposal was accepted by APC on 3 December 2014 subject to the provision of a transition timetable and the final text being put in place by the Assessment Regulations Working Group (ARWG).

In summary:

Entry to the final year of the Integrated Masters will require an average mark in year 4 of 50% or greater with module pass marks applied where modules are not passed at first attempt or compensated. If this criterion is not met, the student will be eligible to exit with a B.Eng. if they have met the university assessment regulations for a BEng. Honours award. All modules must be passed before progression to Integrated Masters.

As the Integrated Masters award is directly tied to the full satisfaction of the Academic Requirements of the relevant professional body associated with the programme, it is permissible for classification criteria for the Integrated Masters route to be specified at the approval stage (justified by sector norms and professional body requirements) and clearly specified in the programme documentation.

The Integrated Masters should be awarded as pass, merit or distinction, in line with the criteria for postgraduate masters awards. The pass mark for Integrated Masters awards will be 50%.

In the event that amendments are not incorporated then a request for exceptions will be made to address:

1. Module pass marks
2. Recording of marks at second attempt
3. Compensation rules
4. Combinations of exam and coursework elements
5. Essential elements for Professional, Statutory or Regulatory Body requirements
6. Consequential effects of module pass marks
7. Nullification of the results of an assessment of a single module
8. Carrying of modules to Integrated Masters' level
9. Progression to final year of Integrated Masters.

### **8.3 Role of External Examiners**

External Examiners are appointed to Programmes. The key duties of the External Examiner are:-

- To ensure that the standard of any award which is recommended by the Assessment Board is comparable to the standard of similar awards conferred by Universities in the United Kingdom
- To satisfy him/herself that the work and decisions of the Assessment Board are consistent with the policies and regulations of the University and best practice in Higher Education

- To ensure that students have been assessed fairly and within the regulations approved by the University for the programme
- To comment on the appropriateness and consistency of assessment practices and procedures across the modules which comprise the award
- To inform the University on any matter which, in his/her view, militates against the maintenance of proper academic standards
- To inform the Clerk to Senate if he/she decides to resign over a matter of principle in order that this may be brought to the attention of Senate as a matter of urgency
- To produce annually a report for consideration by the School Board and, subsequently, the Academic Policy Committee, on the standards attained by students on the programme and on any other matters which may seem appropriate for report.