Programme Specification[1]

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

Programme Title	UCAS Code	GU Code
MEng Electronic and Software Engineering		HG66-2204

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:

The MEng programme is an integrated Masters programme in Electronic and Software 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:

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[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.

- present an integrated in depth multidisciplinary programme of study which will provide the student with knowledge and understanding of Electronic and Software Engineering;
- provide opportunities for the student to study in depth a choice of specialist topics within the field of Electronic and Software Engineering;
- provide an opportunity for students to develop transferable problem solving skills in Electronic and Software Engineering in group and large scale individual project work;
- provide technical awareness in appropriate specialist applications of technology in the Electronic and Software 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 Electronic and Software 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 Electronic and Software Engineering, to solve, in depth, analytical, design or theoretical problems in the field of Electronic and Software Engineering;
- Apply their knowledge and understanding of physical laws, mathematics, numerical analysis and other relevant information in order to model Electronic and Software Engineering and similar systems;
- Draw on materials from a range of courses and wider reading in Electronic and Software Engineering principles and in related disciplines in order to solve problems in Electronic and Software Engineering including demonstrating depth and breadth to their learning;
- Apply business and management techniques that are relevant to Electronic and Software Engineering and Electronic and Software Engineers;
- Explain the role of Electronic and Software Engineers in society and the constraints within which their engineering judgement will be exercised;
- Explain the professional and ethical responsibilities of Electronic and Software Engineers;
- Consider the national and international role of the Electronic and Software 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 Electronic and Software Engineering;
- Design, from requirement, market need or specification, an Electronic and Software 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 Electronic and Software 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 Electronic and Software 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 Electronic and Software 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 Electronic and Software 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 Electronic and Software 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 Electronic and Software 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 Electronic and Software 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 mathematic skills (algebra, geometry, modelling, analysis);
- Transfer techniques and solutions from one field of engineering to another and to the Electronic and Software 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   HG66-2204

MEng Year 1
Compulsory Courses

Course Code	Course	Credits	Semester
ENG1021	Electronic Engineering 1X	20	1
ENG1022	Electronic Engineering 1Y	20	2
ENG1063	Engineering Mathematics 1	40	1 & 2
		80	

Computing Science Year 1 Standard Route (choose 40 credits)

Course Code	Course	Credits	Semester
COMPSCI1001	Computing Science - 1P	20	1 & 2
COMPSCI1002	Computing Science - 1Q	20	1 & 2

Computing Science Year 1 Alternative Route (choose 40 credits)

Course Code	Course	Credits	Semester
COMPSCI1016	Computing Science - 1CT Introduction to Computational Thinking	20	1
COMPSCI1017	Computing Science - 1PX Further Programming	10	2
COMPSCI1018	Computing Science - 1S Systems	10	2

Computing Science Year 1 Exceptional Route (choose 50 credits)

Course Code	Course	Credits	Semester
COMPSCI1002	Computing Science - 1Q	20	1 & 2
COMPSCI1016	Computing Science - 1CT Introduction to Computational Thinking	20	1
COMPSCI1017	Computing Science - 1PX Further Programming	10	2

MEng Year 2
Compulsory Courses

Course Code	Course	Credits	Semester
COMPSCI2005	CS 2T: Computer Systems 2	10	1
COMPSCI2007	CS2X: Algorithms and Data Structures 2	10	2
COMPSCI2008	CS2Y:OOSE2	10	2
COMPSCI2001	CS2P:Java Programming 2	10	1
COMPSCI2021	CS 2U: Web Application Development 2	10	2
ENG2004	Analogue Electronics 2	10	2
ENG2020	Digital Electronics 2	10	1

Course Code	Course	Credits	Semester
ENG2023	Electrical Circuits 2	10	1
ENG2025	Electronic Design Project 2	10	2
ENG2029	Embedded Processors 2	10	2
ENG2086	Engineering Mathematics 2	20	1

MEng Year 3
Compulsory Courses

Course Code	Course	Credits	Semester
COMPSCI4010	Computing Science 3Q: Advanced Programming 3	10	1
COMPSCI4011	Computing Science 3S: Operating Systems 3	10	2
COMPSCI4012	Computing Science 3T: Networked Systems 3	10	2
COMPSCI4015	Computing Science 3X: Professional Software Development 3	20	1 & 2
COMPSCI4044	Team Project ESE3 (Software)	20	1 & 2
COMPSCI4046	Software Engineering Summer Placement	10	Summer
ENG3014	Communication Systems 3	10	1
ENG3015	Control EE3	10	2
ENG3026	Electronic System Design 3	10	1
ENG3043	Real Time Computer Systems 3	10	1
		120	

Optional Courses (choose 10 credits)

Course Code	Course	Credits	Semester
ENG3020	Digital Circuit Design 3	10	2
ENG3036	Simulation of Eng Systems 3	10	1

MEng Year 4
Compulsory courses

Course code	Course	Credits	Semester
ENG4085	Integ System Design Project 4	20	1 & 2
ENG4172	Team Project EE4	20	1

Course Code	Course	Credits	Semester
ENG4042	Control 4	10	1
ENG4036	Biosensors and Diagnostics 4	10	2
ENG4042	Digital Communication 4	20	1
ENG4052	Digital Signal Processing 4	20	1
ENG4053	Microwave Electronic and Optoelectronic Devices 4	20	1
ENG4099	Advanced Devices 4	20	2
ENG4100	Power Systems 4	20	2
ENG4104	Robotics 4	20	2
ENG4118	VLSI Design 4	20	2
ENG4138	Cellular Biophysics 4	20	1
ENG4181	Navigation Systems 4	10	1
ENG4184	Radar and Electro-Optic Systems 4	10	1
ENG4185	Radar and Electro-Optic Sys 4	10	2
ENG4187	Power Electronics and Drives 4	20	1
ENG4001	Acoustics and Audio Technology 4	20	2

Optional Courses (choose 20 credits)

Course code	Course	Credits	Semester
COMPSCI4002	Advanced Networking and Communications	10	2
COMPSCI4007	Distributed Algorithms and Systems 4	10	2
COMPSCI4019	Software Engineering for Financial Systems 4	10	1
COMPSCI4067	Component Based Software Engineering (M)	10	2

Optional Courses (choose 20 credits)

Course Code	Course	Credits	Semester
COMPSCI4002	Advanced Networking and Communications	10	2
COMPSCI4003	Artificial Intelligence 4	10	2
COMPSCI4004	Computer Architecture 4	10	1
COMPSCI4007	Computing Science in the Classroom	10	2
COMPSCI4017	Distributed Algorithms and Systems 4	10	1 & 2
COMPSCI4019	Functional Programming 4	10	1
COMPSCI4021	Human-Computer Interaction 4	10	1
COMPSCI4023	Modelling Reactive Systems 4	10	1
COMPSCI4031	Multimedia Systems and Applications 4	10	1
COMPSCI4033	Safety-Critical Systems Development 4	10	2
COMPSCI4045	Machine Learning 4	10	1
COMPSCI4061	Cyber Security 4	10	2
COMPSCI4062	Big Data: Systems, Programming, and Management	10	2
COMPSCI4064	Research Methods and Techniques 4	10	1
COMPSCI4065	Computer Vision Methods and Applications 4	10	1
COMPSCI4066	Software Engineering for Financial Systems 4	10	1

MEng level 5

Compulsory courses

Course code	Course	Credits	Semester
ENG5026	Design Special Topic 5	20	2
ENG5041P	Individual Project 5	60	1

MEng level 5

Optional courses

Course code	Course	Credits	Semester
COMPSCI5001	**Advanced Op Systems (M)**	10	2

COMPSCI5006	Constraint Programming (M)	10	2
COMPSCI5011	Information Retrieval (M)	10	2
COMPSCI5013	IT Architecture (M)	10	2
COMPSCI5014	Machine Learning (M)	10	2
COMPSCI5015	Mobile HCI (M)	10	2
COMPSCI5063	Cyber Security Fundamentals M	10	2
COMPSCI5075	Modelling Reactive Systems (M)	10	2
ENG5009	Robust Control 5	10	2
ENG5048	Intro to Wind Engineering	10	2
ENG5055	Micro and Nano Technology	20	2
ENG5056	Micro and Mm Wave Circuit Des	20	2
ENG5066	Optical Communications	20	2
ENG5220	Real Time Embedded Programming	20	2
ENG5250	Energy Conversion Systems M	10	2
ENG5261	Advanced Devices M	20	2
ENG5302	Ultrasound Technology and Apps	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 Engineering and Technology (IET) 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 Engineering and Technology (http://www.theiet.org/)

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:	29/09/2017