Programme Specification[1]

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

Programme Title	*UCAS Code*	*GU Code*
BEng Electronic and Software Engineering		GHP6-2200

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:

This degree programme aims to:

- 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 some specialist topics within the field of Electronic and Software Engineering;
- provide an opportunity for students to develop transferable problem solving skills in Electronic 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.

Software Engineering and 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 some 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 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 engineering;
- Apply some business and management techniques that are relevant to Electronic and Software Engineering and Electronic and Software Engineers;
- Consider the role of Electronic and Software Engineers in society and the constraints within which their engineering judgement will be exercised;
- Consider 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;
- 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 some Electronic and Software 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 Electronic and Software 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 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;
- 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 GHP6-2200

BEng 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

BEng 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
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

BEng 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

BEng Year 4

Compulsory Courses

Course Code	Course	Credits	Semester
COMPSCI4038	Professional Skills and Issues 4	10	1 & 2
ENG4066P	Final Year Project ESE4	40	1 & 2
		50	

Optional Courses (choose 40 credits)

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

Optional Courses (choose 20 credits)

Course Code	Course	Credits	Semester
COMPSCI4002	Advanced Networking and Communications 4	10	2
COMPSCI4007	Computer Architecture 4	10	2
COMPSCI4019	Distributed Algorithms and Systems 4	10	1
COMPSCI4067	Software Engineering for Financial Systems 4	10	2
COMPSCI5056	Component Based Software Engineering (M)	10	2

Optional Courses (choose 20 credits)

Course Code	Course	Credits	Semester
COMPSCI4002	Advanced Networking and Communications 4	10	2
COMPSCI4003	Algorithmics 4	10	2
COMPSCI4004	Artificial Intelligence 4	10	1
COMPSCI4007	Computer Architecture 4	10	2
COMPSCI4017	Computing Science in the Classroom	10	1 & 2
COMPSCI4019	Distributed Algorithms and Systems 4	10	1
COMPSCI4021	Functional Programming 4	10	1
COMPSCI4023	Human-Computer Interaction 4	10	1
COMPSCI4031	Modelling Reactive Systems 4	10	1
COMPSCI4045	Safety-Critical Systems Development 4	10	1
COMPSCI4061	Machine Learning 4	10	2

COMPSCI4062	Cyber Security 4	10		2
COMPSCI4064	Big Data: Systems, Programming, and Management	10		1
COMPSCI4065	Research Methods and Techniques 4	10		1
COMPSCI4066	Computer Vision Methods and Applications 4	10		1
COMPSCI4067	Software Engineering for Financial Systems 4	10		2
COMPSCI4076	Robotics Foundations (H)	10	1	1
COMPSCI4077	Web Science (H)	10	1	1

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 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 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