Programme Specification

Programme Summary Information				
1	**Course Titles**		BEng (Hons) Electronic Engineering BEng (Hons) Electronic Engineering with Sandwich Year MEng Electronic Engineering MEng Electronic Engineering with Sandwich Year	
2	**BCU Course Codes**	**UCAS Codes**	BEng (Hons) US0717 MEng UM0020	H601 H679
3	**Awarding Institution**		Birmingham City University	
4	**Teaching Institution(s)** (if different from point 3)			
5	**Professional Statutory or Regulatory Body (PSRB) accreditation** (if applicable)			

6	**Programme Description**
	Do you want to work at the forefront of industry? Our BEng (Hons) / MEng Electronic Engineering course will teach you a broad range of skills, helping you to become a rounded electrical engineer. Throughout your degree study, you'll have access to our state-of-the-art technology and resources, plus you'll have the opportunity to secure yourself an industry placement, giving you instrumental electrical engineering work experience. **What's covered in the course?** The Electronic Engineering MEng will give you an understanding of the social, commercial, legal, ethical, economic and environmental factors associated with engineering, as well as comprehensive knowledge of the science and mathematics associated with the discipline. You will also develop the key transferrable skills that modern employers require, such as problem solving, project planning, presentation and communication. Our competitions, such as the annual Engineering Show, which includes the international micro-mouse competition, gives you the opportunity to participate in a range of competitions centered on autonomous and non-autonomous robotic vehicles. Our engineering courses focus on project-based activities, giving you lots of opportunity to work in teams on projects from design to implementation. This will give you practical experience of applying engineering science to real world problems, working in multidisciplinary teams to develop your interpersonal skills, and prepare you for a key aspect of modern engineering practice. You'll also have the option of a placement during your course, either through a summer internship or year-long sandwich placement, which will provide you with the real-life skills and experience you'll need to stand out from the crowd upon graduation. This has helped former graduates progress into roles within companies such as UTC Aerospace and Vector GB.

7	Programme Awards		
7a	**Final Award for the Electronic Engineering programme**	**Level**	**Credits Awarded**
	For BEng (Hons): Bachelor of Engineering with Honours Electronic Engineering Bachelor of Engineering with Honours Electronic Engineering with Sandwich year **For MEng:** Integrated Master of Engineering Electronic Engineering Integrated Master of Engineering Electronic Engineering with Sandwich Year	 6 6 7 7	 360 480 480 600
7b	**Exit Awards and Credits Awarded for the Electronic Engineering programme**		
	Certificate of Higher Education Electronic Engineering Diploma of Higher Education Electronic Engineering Bachelor of Engineering Electronic Engineering	4 5 6	120 240 300

8	Derogation from the University Regulations
	1. For modules with more than one item of assessment, students must achieve a minimum of 30% (undergraduate) or 40% (postgraduate) in each item of assessment in order to pass the module 2. Compensation of marginal failure in up to 20 credits is permitted at each level 3. Condonement of failed modules is not permitted 4. Students on an Integrated Masters course must achieve an overall average of 50% or above at the end of Level 5 to remain on the Integrated Masters course.

9	Delivery Patterns		
Mode(s) of Study	**Location**	**Duration of Study**	**Code**
BEng (Hons) Full Time	City Centre	3 years	US0717
BEng (Hons) Sandwich	City Centre	4 years	US0717S
BEng (Hons) Part Time	City Centre	5 years	US0718
MEng Full Time	City Centre	4 years	UM0020
MEng Sandwich	City Centre	5 years	UM0020S

10	Entry Requirements
	The admission requirements for this programme are stated on the programme page of the BCU website at https://www.bcu.ac.uk/ or may be found by searching for the programme entry profile located on the UCAS website.

11	**Programme Learning Outcomes**
Red text applies to MEng only	
Science and Mathematics (SM)	
SM1i	Knowledge and understanding of the scientific principles underpinning relevant technologies, and their evolution
SM2i	Knowledge and understanding of mathematics and an awareness of statistical methods necessary to support application of key engineering principles
SM1b	Knowledge and understanding of scientific principles and methodology necessary to underpin their education in Electronic engineering, to enable appreciation of its scientific and engineering context, and to support their understanding of relevant historical, current and future developments and technologies
SM2b	Knowledge and understanding of mathematical and statistical methods necessary to underpin their education in Electronic engineering and to enable them to apply mathematical and statistical methods, tools and notations proficiently in the analysis and solution of engineering problems
SM3b	Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of their Electronic engineering discipline
SM1m	A comprehensive knowledge and understanding of the scientific principles and methodology necessary to underpin their education in Electronic engineering, and an understanding and know-how of the scientific principles of related disciplines, to enable appreciation of the scientific and engineering context, and to support their understanding of relevant historical, current and future developments and technologies
SM2m	Knowledge and understanding of mathematical and statistical methods necessary to underpin their education in Electronic engineering and to enable them to apply a range of mathematical and statistical methods, tools and notations proficiently and critically in the analysis and solution of engineering problems
SM3m	Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of their Electronic engineering discipline and the ability to evaluate them critically and to apply them effectively
SM4m	Awareness of developing technologies related to own specialisation.
SM5m	A comprehensive knowledge and understanding of mathematical and computational models relevant to the Electronic engineering, and an appreciation of their limitations
SM6m	Understanding of concepts from a range of areas, including some outside engineering, and the ability to evaluate them critically and to apply them effectively in engineering projects

Engineering Analysis (EA)	
EA1i	Ability to monitor, interpret and apply the results of analysis and modelling in order to bring about continuous improvement
EA2i	Ability to apply quantitative methods in order to understand the performance of systems and components
EA3i	Ability to use the results of engineering analysis to solve engineering problems and to recommend appropriate action
EA4i	Ability to apply an integrated or systems approach to engineering problems through know-how of the relevant technologies and their application
EA1b	Understanding of engineering principles and the ability to apply them to analyse key engineering processes
EA2	Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques
EA3b	Ability to apply quantitative and computational methods in order to solve engineering problems and to implement appropriate action
EA4b	Understanding of, and the ability to apply, an integrated or systems approach to solving engineering problems
EA1m	Understanding of engineering principles and the ability to apply them to undertake critical analysis of key engineering processes
EA3m	Ability to apply quantitative and computational methods, using alternative approaches and understanding their limitations, in order to solve engineering problems and implement appropriate action.
EA4m	Understanding of, and the ability to apply, an integrated or systems approach to solving complex engineering problems
EA5m	Ability to use fundamental knowledge to investigate new and emerging technologies
EA6m	Ability to extract and evaluate pertinent data and to apply engineering analysis techniques in the solution of unfamiliar problems
Design (D)	
D1i	Be aware of business, customer and user needs, including considerations such as the wider engineering context, public perception and aesthetics
D2i	Define the problem identifying any constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards
D3	Work with information that may be incomplete or uncertain and be aware that this may affect the design
D4i	Apply problem-solving skills, technical knowledge and understanding to create or adapt designs solutions that are fit for purpose including operation, maintenance, reliability etc.
D5i	Manage the design process, including cost drivers, and evaluate outcomes
D6	Communicate their work to technical and non-technical audiences
D1	Understand and evaluate business, customer and user needs, including considerations such as the wider engineering context, public perception and aesthetics
D2	Investigate and define the problem, identifying any constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards.
D3b	Work with information that may be incomplete or uncertain and quantify the effect of this on the design

D4	Apply advanced problem-solving skills, technical knowledge and understanding, to establish rigorous and creative solutions that are fit for purpose for all aspects of the problem including production, operation, maintenance and disposal
D5	Plan and manage the design process, including cost drivers, and evaluate outcomes
D3m	Work with information that may be incomplete or uncertain, quantify the effect of this on the design and, where appropriate, use theory or experimental research to mitigate deficiencies
D7m	Demonstrate wide knowledge and comprehensive understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations
D8m	Demonstrate the ability to generate an innovative design for products, systems, components or processes to fulfil new needs
Economic, Legal, Social, Ethical and Environmental Context (EL)	
EL1	Understanding of the need for a high level of professional and ethical conduct in engineering and a knowledge of professional codes of conduct
EL2	Knowledge and understanding of the commercial, economic and social context of engineering processes
EL3i	Knowledge of management techniques that may be used to achieve engineering objectives
EL4i	Understanding of the requirement for engineering activities to promote sustainable development
EL5	Awareness of the relevant legal requirements governing engineering activities, including personnel, health & safety, contracts, intellectual property rights, product safety and liability issues
EL6i	Awareness of risk issues, including health & safety, environmental and commercial risk
EL3	Knowledge and understanding of management techniques, including project management, that may be used to achieve engineering objectives
EL4	Understanding of the requirement for engineering activities to promote sustainable development and ability to apply quantitative techniques where appropriate
EL6	Knowledge and understanding of risk issues, including health and safety, environmental and commercial risk, and of risk assessment and risk management techniques
EL1m	Understanding of the need for a high level of professional and ethical conduct in engineering, a knowledge of professional codes of conduct and how ethical dilemmas can arise
EL3m	Knowledge and understanding of management techniques, including project and change management, that may be used to achieve engineering objectives, their limitations, and how they may be applied appropriately
EL5m	Awareness of relevant legal requirements governing engineering activities, including personnel, health & safety, contracts, intellectual property rights, product safety and liability issues, and an awareness that these may differ internationally
EL6m	Knowledge and understanding of risk issues, including health and safety, environmental and commercial risk, risk assessment and risk management techniques and an ability to evaluate commercial risk
EL7m	Understanding of the key drivers for business success, including innovation, calculated commercial risks and customer satisfaction

Engineering Practice (P)	
P1i	Knowledge of contexts in which engineering knowledge can be applied (e.g. operations and management, application and development of technology, etc.)
P2i	Understanding of and ability to use relevant materials, equipment, tools, processes, or products
P3i	Knowledge and understanding of workshop and laboratory practice
P4i	Ability to use and apply information from technical literature
P6i	Ability to use appropriate codes of practice and industry standards
P7	Awareness of quality issues and their application to continuous improvement
P11i	Awareness of team roles and the ability to work as a member of an engineering team
P1	Understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, application and development of technology, etc.)
P2	Knowledge of characteristics of particular materials, equipment, processes or products
P3	Ability to apply relevant practical and laboratory skills
P4	Understanding of the use of technical literature and other information sources
P5	Knowledge of relevant legal and contractual issues
P6	Understanding of appropriate codes of practice and industry standards
P8	Ability to work with technical uncertainty
P11	Understanding of, and the ability to work in, different roles within an engineering team
P2m	Knowledge of characteristics of particular equipment, processes or products, with extensive knowledge and understanding of a wide range of engineering materials and components
P4m	Understanding of the use of technical literature and other information sources
P8m	Ability to work with technical uncertainty
P9m	A thorough understanding of current practice and its limitations, and some appreciation of likely new developments
P10m	Ability to apply engineering techniques taking account of a range of commercial and industrial constraints
P11m	Understanding of different roles within an engineering team and the ability to exercise initiative and personal responsibility, which may be as a team member or leader
Additional General Skills (G)	
G1	Apply their skills in problem solving, communication, information retrieval, working with others and the effective use of general IT facilities
G2	Plan self-learning and improve performance, as the foundation for lifelong learning/CPD
G3i	Plan and carry out a personal programme of work
G4i	Exercise personal responsibility, which may be as a team member

G3	Plan and carry out a personal programme of work, adjusting where appropriate
G4	Exercise initiative and personal responsibility, which may be as a team member or leader
G3m	Monitor and adjust a personal programme of work on an on-going basis

12	**Programme Requirements: BEng / MEng**

12a **Level 4:**

In order to complete this programme a student must successfully complete all the following CORE modules (totalling 120 credits):

Module Code	Module Name	Credit Value
ENG4091	Engineering Principles 1	20
ENG4124	Mathematical Modelling 1	20
ENG4093	Engineering Practice	20
ENG4094	Engineering Principles 2	20
ENG4125	Mathematical Modelling 2	20
ENG4096	Integrated Engineering Project	20

Level 5:

In order to complete this programme a student must successfully complete all the following CORE modules (totalling 120 credits):

Module Code	Module Name	Credit Value
ENG5093	Mathematics for Signals and Systems	20
ENG5092	Analogue and Digital Electronics	20
ENG5094	Engineering Electronic Systems	20
ENG5097	Leading Engineering Endeavour	20
ENG5095	Microcontroller System Design and Programming	20
ENG5096	Electronics Project	20

Level 6:

In order to complete this programme a student must successfully complete all the following CORE modules (totalling 120 credits):

Module Code	Module Name	Credit Value
ENG6066	Digital Filters and Spectral Analysis	20
ENG6067	Embedded Systems and Control	20
ENG6068	Communication Systems and Networks	20
ENG6069	High Frequency and Power electronics	20
ENG6200	Individual Honours Project	40

Level 7:

In order to complete this programme a student must successfully complete all the following CORE modules (totalling 120 credits):

Module Code	Module Name	Credit Value
ENG7158	Digital Microelectronics and Hardware Description Languages	20
ENG7148	Control Engineering	20
ENG7157	Analogue Microelectronics and Integrated Circuit Architecture	20
ENG7154	Applied Digital Signal Processing	20
ENG7207	Group Integrated Master's Project	40

12b Structure Diagram

Programme Module Grid Full-Time Electronic Engineering

Level 4				
Engineering Practice (ENG4093)	Engineering Principles 1 (ENG4091)	Mathematical Modelling 1 (ENG4124)		Sem 1
Integrated Engineering Project (ENG4096)	Engineering Principles 2 (ENG4094)	Mathematical Modelling 2 (ENG4125)		Sem 2
Level 5				
Analogue and Digital Electronics (ENG5092)	Mathematics for Signals and Systems (ENG5093)	Engineering Electronic Systems (ENG5094)		Sem 1
Leading Engineering Endeavour (ENG5097)	Microcontroller System Design & Programming (ENG5095)	Electronics Project (ENG5096)		Sem 2
Optional				
Sandwich Year / Industrial Placement (120 Credits)				All Year
Level 6				
Individual Honours Project (ENG6200)	Digital Filters and Spectral Analysis (ENG6066)	Embedded Systems and Control (ENG6067)		Sem 1
	Communications Systems and Networks (ENG6068)	High Frequency and Power electronics (ENG6069)		Sem 2
Level 7				
Group Integrated Master's Project (ENG7207)	Control Engineering (ENG7148)	Digital Microelectronics and Hardware Description Languages (ENG7158)		Sem 1
	Analogue Electronics and IC Architecture (ENG7157)	Applied Digital Signal Processing (ENG7154)		Sem 2

Programme Routes:

---------- BEng (Hons) Electronic Engineering

---------- MEng Electronic Engineering Route

Programme Module Grid Part-Time Electronic Engineering

Year 1		
Engineering Principles 1 (ENG4091)	Mathematical Modelling 1 (ENG4124)	Sem 1
Engineering Principles 2 (ENG4094)		Sem 2
Year 2		
Engineering Practice (ENG4093)		Sem 1
Integrated Engineering Project (ENG4096))	Mathematical Modelling 2 (ENG4125)	Sem 2
Year 3		
Mathematics for Signals and Systems (ENG5093)	Analogue and Digital Electronics (ENG5092)	Sem 1
Microcontroller System Design & Programming (ENG5095)	Leading Engineering Endeavour (ENG5097)	Sem 2
Year 4		
Embedded Systems and Control (ENG6067)	Engineering Electronic Systems (ENG5094)	Sem 1
Communications Systems and Networks (ENG6068)	Electronics Project (ENG5096)	Sem 2
Year 5		
Individual Honours Project (ENG6200)	Digital Filters and Spectral Analysis (ENG6066)	Sem 1
	High Frequency and Power electronics (ENG6069)	Sem 2

13 Overall Student Workload and Balance of Assessment

Overall student *workload* consists of class contact hours, independent learning and assessment activity, with each credit taken equating to a total study time of around 10 hours. While actual contact hours may depend on the optional modules selected, the following information gives an indication of how much time students will need to allocate to different activities at each level of the course.

- *Scheduled Learning* includes lectures, practical classes and workshops, contact time specified in timetable
- *Directed Learning* includes placements, work-based learning, external visits, on-line activity, Graduate+, peer learning
- *Private Study* includes preparation for exams

The *balance of assessment* by mode of assessment (e.g. coursework, exam and in-person) depends to some extent on the optional modules chosen by students. The approximate percentage of the course assessed by coursework, exam and in-person is shown below.

Level 4

Workload

% time spent in timetabled teaching and learning activity

Activity	Number of Hours
Scheduled Learning	432
Directed Learning	0
Private Study	768
Total Hours	1200

Balance of Assessment

Assessment Mode	Percentage
Coursework	27%
Exam	47%
In-Person	26%

Level 5

Workload

% time spent in timetabled teaching and learning activity

Activity	Number of Hours
Scheduled Learning	312
Directed Learning	0
Private Study	888
Total Hours	1200

Balance of Assessment

Assessment Mode	Percentage
Coursework	50%
Exam	32%
In-Person	18%

Level 6

Workload

% time spent in timetabled teaching and learning activity

Activity	Number of Hours
Scheduled Learning	210
Directed Learning	12
Private Study	978
Total Hours	1200

Balance of Assessment

Assessment Mode	Percentage
Coursework	40%
Exam	60%
In-Person	0

Level 7

Workload

% time spent in timetabled teaching and learning activity

Activity	Number of Hours
Scheduled Learning	156
Directed Learning	18
Private Study	1026
Total Hours	1200

Balance of Assessment

Assessment Mode	Percentage
Coursework	48%
Exam	40%
In-Person	12%