Programme Specification
[Foundation Degree in Electronic and Control Engineering]

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NOTE: This specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes advantage of the learning opportunities that are provided. More detail on the specific learning outcomes, indicative content and the teaching, learning and assessment methods of each module can be found (1) at [Faculty web site address], (2) in the Module Specifications and (3) in the Course Guide.

The accuracy of the information contained in this document is reviewed by the University and may be checked within independent review processes undertaken by the Quality Assurance Agency.

Awarding Institution / Body:	Birmingham City University
Teaching Institution:	Birmingham Metropolitan College
Interim Awards and Final Award:	**Final Award:** Fd Eng (Electronic and Control Engineering) **Fall back Award:** Certificate of HE
Programme Title:	Foundation Degree in Electronic and Control Engineering
Main fields of Study:	Electronic and Control Engineering
Modes of Study:	Part-time, block
Language of Study:	English
UCAS Code:	
JACS Code:	

Professional Status of the programme (if applicable):

Recognition of the programme through a professional body will be sought.

Relevant subject benchmark statements and other external reference points used to inform programme outcomes:

The programme has been benchmarked against standards for Foundation Degrees in Engineering.

Programme philosophy and aims

The Foundation Degree in Electronic and Control Engineering has been developed to meet the training needs of those employed or interested in a career in the Electronic, Control Engineering and related industries. At Level 4 and Level 5, students will study a range of modules totalling 240 credit points and is equivalent to Stage 1 and Stage 2 of a university honours degree. The programme will provide progression directly on to Stage 3 of an honours degree programme in engineering.

A similar programme has been running at this institution since 2007 and has continuously attracted a good number of students employed in a range of industries such as vehicle manufacture, food and drink production, rail, aerospace, healthcare, and general engineering.

The College has excellent relationships with a range of major local, national and international companies who each year send their trainees to study on our foundation degree programmes in engineering. It is expected that over 90% of the students studying on the programme will be employed in the industry and sponsored by their employer.

Having completed their foundation degree, a good number of students have previously progressed and completed a top-up to full honours degree at local universities. A number of students have also achieved first class honours and gone on to complete a master's degree. It is expected that with this programme with Birmingham City University, progression on to honours degree and further will be more attractive to students, particularly due to the close alignment of the content with the university's degree programme and the location of the university being very accessible to students who reside and are employed locally.

The content of the programme has been influenced by a range of employers.

The course modules have been chosen to be relevant to a wide range of disciplines within the industry, this includes Electronics, Instrumentation and Control Engineering, Data Communications, Electronic Design and a Work-Based Project. These modules are also supported by those providing underpinning knowledge and skills such as Mathematics, Electrical Principles and Engineering Management. Studies include the relevant theory, application, practical circuit construction and test, and use of Computer Simulation to design and test electronic systems. The modules have direct application in the world of work. In particular, the Work-Based Project enables the student to manage a personal project of commercial significance to their employer.

The College has, for many years, been well-equipped with practical resources to support the study of electronics, control, instrumentation and manufacturing. This has included laboratories for practical electronic circuit construction and test, control system investigation with dedicated hardware and software units, enabling students to put together a control system and evaluate its performance, PLC programming units linked to sensors and actuators, and a Cisco Learning Academy used for the teaching of Data Communication. This is supplemented by a number of Computer-Aided Design, Simulation and general IT rooms and a good Learning and Resource Centre.

In the Spring of 2015, the College invested heavily in resources to support electronics, control, robotics and manufacturing, adding to the existing provision. It has recently developed new laboratories for the study of electronic, control, robotics, automation, and manufacturing. The new resources include a simulated manufacturing environment consisting of a conveyor with a number of stations with pick and place robotic elements, sensors, actuators, controlled by programmable logic controllers. A separate robotics laboratory houses industrial standard robots where students can carry out simulated robotic control, and send their programs to a robot to carry out actions. These new resources will well support the needs of the students studying on the programme, giving them access to world class resources.

The aims of the programme are to:

- Provide relevant, high quality training and education for those employed (or seeking employment) in the wider field of electronic, control engineering, and related industries.
- Provide a recognised qualification at advanced technician level that will support student progression in their field of employment.
- Provide a progression route on to honours degree, masters and chartered engineer status.
- Enable the student to develop a range of skills in electronic and control engineering and generic skills such as analytical, evaluative and communication, ensuring they can become an effective practitioner in their field and are able to take on more advanced programmes of study.
- To ensure that the wider community has access to employment opportunities by means of good-quality training.
- To ensure that local, national and international companies have access to training that continues to meet their needs.
- To continue to support industry by maintaining and developing partnerships.

Intended learning outcomes and the means by which they are achieved and demonstrated:

Learning Outcomes[1]

1. Explain the operation of a wide range of electronic circuits and systems utilised in the field of electronic and control engineering.

2. Apply design and evaluative skills to develop, implement and test a range of electronic circuits and communicate in a professional manner.

3. Apply programming and hardware interfacing techniques to implement control systems using Programmable Logic Controllers and Microprocessors.

4. Apply data communication techniques to set up hardware and software for computer networks.

Knowledge and Understanding

KU1 Apply Mathematical methods for analysis, modelling and simulation of applied electronic engineering systems;

KU2 Understand fundamental concepts, theories and technologies that underpin electronic engineering;

KU3 Use technologies for analysis, modelling, design, implementation and testing of analogue electronics, digital electronics, and embedded systems.

KU4 Apply organisational, teamwork and management approaches required by professional engineers;

KU5 Use commercial, ethical, regulatory and environmental factors that influence engineering solutions;

Intellectual Skills

IS1 Analyse and evaluate information from a variety of sources and in various formats used in electronic engineering;

IS2 Specify requirements and devise and implement designs and solutions for electronic systems.

IS3 Apply professional judgement to engineering decisions.

IS4 Evaluate electronic engineering techniques and products and make reasoned choices and recommendations.

[1] Guidance on the specification of learning outcomes is available from the Centre for the Enhancement of Learning and Teaching.

Practical Skills

PS1 Use laboratory and workshop equipment safely and record data competently;

PS2 Apply tools and techniques for the design, implementation, testing and maintenance of electronic systems;

PS3 Use computer based systems and software for designing and modelling electronic systems;

PS4 Apply appropriate research techniques using a variety of sources and compile findings;

PS5 Manage an engineering project.

Transferrable Skills

TS1 Monitor, record, present, analyse and interpret data;

TS2 Communicate effectively using written, oral and ICT based media;

TS3 Manage time and prioritise activities;

TS4 Access and make use of numerical and statistical information;

TS5 Make effective use of information and communication technologies, including word processing, spreadsheets, the internet, email and electronic information systems;

TS6 Reflect on own learning and relate and work effectively with others in a group situation.

Learning teaching, and assessment methods used

Teaching methods

The following teaching methods will be used:

1. Formal Lecture with student participation, group tutorials, one-to-one tutorials, practical experimentation, problem solving, computer aided design and simulation, case studies, design workshops, project, guided self-study and research.

2. The vast majority of students will be employed in the industry and will also benefit from work-based learning and putting skills and practices gained on the programme into action, directly in their job role. A particular vehicle for this is the Work-Based Project. In this module students will agree a suitable project of some commercial significance and benefit to their employer and carry out research, analyse information, evaluate implementation methods, produce a professional report and deliver an oral presentation to staff and peers.

Summative Assessment Methods

A range of summative assessments will be used including assignments, written examination, project report, oral presentation, and viva.

Many modules have several types of summative assessment such as assignment and written examination, while some of the highly practical modules are assessed entirely by coursework. The assessment strategy provides a balance between the different assessment methods and is appropriate to the modules concerned.

Formative Assessment Methods

Students will undertake range of activities throughout the course and receive tutor feedback both verbally and in writing. This will include; practical experimentation, computer aided design and simulation, completion of worksheets, case studies and directed study.

Programme structure and requirements, levels, modules, credits and awards

Programme Modules, Level and Credit Values

Stage 1

Module	Level	Credit Value	ECTS	Prerequisite
BMCF400 Electrical and Electronic Principles	4	20	10	None
BMCF401 Mathematics for Engineering	4	20	10	None
BMCF402 Analogue and Digital Electronics	4	20	10	None
BMCF403 Programmable Logic Controllers	4	20	10	None
BMCF404 Programming for Engineers	4	20	10	None
BMCF416 Engineering Management	4	20	10	None
Total		**120**	**60**	

Stage 2

Module	Level	Credit Value	ECTS	Prerequisite
BMCF501 Control and Instrumentation	5	20	10	
BMCF502 Applied Mathematics	5	20	10	BMCF401
BMCF503 Analogue Circuit Design	5	15	7.5	BMCF402
BMCF504 Digital Circuit Design	5	15	7.5	BMCF402
BMCF505 Data Communication and Networks	5	20	10	
BMCF506 Embedded Systems	5	15	7.5	
BMCF507 Work-Based Project	5	15	7.5	
Total		**120**	**60**	

Total Credit required for Award of Foundation Degree = 240

Course Structure

							Semester	Level
Stage 2 Study								
Applied Mathematics (20 Credits)	Analogue Circuit Design (15 Credits)	Digital Circuit Design (15 Credits)	Control and Instrumentation (20 Credits)	Embedded Systems (15 Credits)	Data Communication and Networks (20 credits)	Work-Based Project* (15 Credits)	1 & 2	5
Stage 1 Study								
Mathematics for Engineering (20 Credits)	Analogue and Digital Electronics (20 Credits)	Electrical and Electronic Principles (20 Credits)	PLCs (20 Credits)	Programming For Engineers (20 Credits)	Engineering** Management (20 Credits)		1 & 2	4

***** The Work-Based project will be delivered mainly by research and development in the student's place of work, supported by formal group tutorials and one to one tutorials with their personal tutor or mentor. Students who are not employed will agree a suitable project with their tutor.

****** The Engineering Management module will be delivered partly through taught sessions, but also by students undertaking research around case studies and in particular, those applied to their own place of employment.

Support for Learning including Personal Development Planning (PDP)

Students are encouraged to identify and, with guidance, to reflect on their own learning needs and are offered the following support as appropriate to meet those needs:

- An induction programme providing dissemination of essential information.
- A Learning and Resource Centre providing access to a variety of learning resources, with support from staff
- A Student Handbook containing important information including tutors, staff responsibilities, contacts and regulations and requirements of the course.
- Access to the College IT Facilities
- Access to the College Student Services and Careers Advisor
- Access to a Student Counsellor
- Regular group tutorial sessions
- One-to-one tutorials arranged on request
- Consultation with tutor by email, telephone, VLE and other electronic sources

Students will produce their own Personal Development Plans and have periodic reviews with their Personal Tutor.

Criteria for admission

Candidates must satisfy the general admissions requirements of the programme, which are as follows:

Candidates should have ONE of the following:

- A relevant level 3 qualification in Engineering, Science or IT such as a BTEC Level 3 Diploma or Extended Diploma with grades at MP or MPP or above
- One A level preferably in Mathematics or Physics, with a supporting GCSE in English
- A pass on an Access to Higher Education programme recognised by the College

International candidates for which English is not a first language should have an IELTS score of 6.0 or higher in addition to the above entry requirements.

Equivalent qualifications to the above are acceptable and industrial experience will be taken into account. Successful application is subject to an Entry Interview.

Methods for evaluation and enhancement of quality and standards including listening and responding to views of students

The quality of the programme will be closely monitored by all staff involved in its delivery. The Course Director/ Departmental Manager is the local Manager who will oversee the delivery of the programme, the Director for Higher Education and the College Director of Quality, monitor the overall effectiveness and quality through a robust College-Wide Quality Control process. The programme will also adhere to the University's regulations and processes.

The College quality process applied to this programme includes:

- Regular teaching observations and reviews
- Staff skills updating as required
- Regular delivery team meetings
- Standardisation meetings and thorough Internal Verification Process
- Programme consultative meetings involving Student Representatives and course delivery team
- Seeking of student views during group tutorials, one to one tutorials and by formal College survey completion and national surveys.
- Termly Review Boards to review course performance on a regular basis.
- Production of programme Annual Monitoring Reports which detail the performance of the students and programme.
- End of module/programme Examination Boards, attended by an External Examiner.
- A robust system for dealing with complaints or issues, should they arise.

Students will have regular opportunity to present their views to subject tutors during taught sessions, during tutorials and during one-to-one tutorials (by appointment). They will also be able to express their views to the Course Director (by arranged appointment) and also express their views via the student Course Representative who will convey views to the course team, at termly Programme Consultative Meetings.

The Programme Consultative Meetings are attended by the course team, student representatives and where possible the university link tutor. Meetings are minuted and action plans are devised in response to student views.

Students are expected to complete regular quality surveys, both internal and external Higher Education Surveys.