# Course Specification

| Course Summary Information | | | | |
|---|---|---|---|---|
| 1 | **Course Titles** | | BEng (Hons) Electronic Engineering<br>BEng (Hons) Electronic Engineering with Professional Placement Year<br>MEng Electronic Engineering<br>MEng Electronic Engineering with Professional Placement Year | |
| 2 | **BCU Course Codes** | **UCAS Codes** | BEng (Hons) US0717<br>MEng UM0020 | H601<br>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) | | The Institution of Engineering and Technology (IET)<br>*Please see important course accreditation information at the end of section 6, for more information about the IET accreditations. | |

| 6 | **Course 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.<br><br>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.<br><br>**What's covered in the course?**<br>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.<br>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.<br><br>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.<br><br>You'll also have the option of a placement during your course, either through a summer internship or year-long professional 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. |

| | |
|---|---|
| | On completion of this course you will be able to analyse, synthesise and evaluate those engineering factors that are required to produce engineering solutions. You will explore the themes of:<br>• Use of general and specialist engineering knowledge and understanding<br>• Application of appropriate theoretical and practical methods.<br>• Technical and commercial leadership and management at all levels.<br>• Effective interpersonal and communication skills using various media means and resources.<br>• Commitment to professional standards and recognition of obligations to society and environment in accordance with the latest benchmarks.<br><br>Specifically the course will develop your skills in the key area of:-<br>• Electrical, Electronic, Measurement and Communication methodologies, methods techniques and current / developing theories and ideas<br>• Engineering Science and Mathematics<br>• Management, including current management techniques and theories, Risk management, supplier relations and financial control<br>• IT which will include developing your skills the area of CAD, spreadsheets, internet usage and general IT skills<br>• Transferable communication skills, including written, verbal and new media presentations skills<br><br>The above skills areas were identified as being critical for the development of modern high technology Control and Instrumentation organisations such as Rolls Royce, Jaguar Land Rover (JLR), etc. who must have personnel skilled in these areas in order to successfully compete in the global market place.<br><br>**Course Aims:**<br>The content and structure of the Electronic Engineering Course are designed to provide you with an academically challenging and vocationally relevant degree, which encompasses all of the issues involved in successfully entering and progressing your career within the field of Electronic Engineering. Furthermore, the course has clearly identifiable core themes (with significant elements of practical based learning), in which capability skills and competencies can be fostered, demonstrated and further developed. This Electronic Engineering Course Aims are to:<br>• Provide a challenging course in Electrical and Electronic Engineering, designed to allow completers of appropriate qualifications in this field of study.<br>• Meet the needs of the relevant industries and professional bodies in these areas, broadly meeting the educational requirements on your journey to becoming a Chartered Engineer.<br>• Provide knowledge and skills that enable you to engage with continuing professional development in Electrical and Electronic Engineering, on graduation;<br>• Enable you to develop a practical approach to problem solving and decision making, including the use of safe working practices;<br>• Provide an academic education rooted in the principles and technology of Electrical and Electronic Engineering, applying appropriate techniques of design, management, sustainability, and manufacture.<br><br>Furthermore, through the Academic Plan (2015), the University has expressed its commitment to the following course aims to enhance your student experience in all courses:<br>• Pursuing excellence<br>• Practice-led, knowledge-applied education |

- Interdisciplinary approaches
- Employability-driven
- Internationalisation

The following table articulates the course aims framed by the five themes of the Academic Plan:

| | |
|---|---|
| 1. Pursuing Excellence | Through the integration of practice and academic theory you will develop knowledge, understanding and skills needed to solve pertinent electronic engineering problems for now and the future. The course will specialise in the analysis, design and development of analogue, digital and discrete signals and systems. The course has been designed in collaborations with industrial partners to be relevant to industry needs. |
| 2. Practice-led, knowledge-applied | You will focus on the application of industry-standard design, modelling and simulation techniques to support the analysis, specification and implementation of electronic engineering systems. |
| 3. Interdisciplinary | In modules such as Leading Engineering Endeavour (Level 5), you will demonstrate the ability to understand the importance of developing a range of skills associated with cooperation and collaboration when working across disciplines. Engineering is recognised as embedding a range of topics linking to many disciplines. |
| 4. Employability-driven | In addition to professional and practical skills, additional value will be delivered through group work and project based challenges that enable you to compete for a variety of employment opportunities within the electronic engineering and associated industries. |
| 5. Internationalisation | You will demonstrate a consideration of the wider aspects and global impact of your discipline and an ability to contribute to the engineering sector in different international contexts. |

In addition, the following course aims apply:

- To provide a challenging undergraduate course in Electronic Engineering and to meet the needs of the relevant industries and professional bodies in these areas.
- To provide you with the knowledge and skills that enables you to engage with continuing professional development and further study in the disciplines of Control and Instrumentation Engineering on graduation.
- To enable you to develop a practical approach to problem solving and decision making within the field of Electronic Engineering.
- To provide flexible learning opportunities and widening access and thus facilitate study in the discipline by learners from a board a background as possible, and to enable you to become an independent learner developing as an individual for the rest of your life.
- To provide you with an academic education focussing on the technology, design, project management, manufacture and health and safety pertaining to the relevant industries.
- The ability to relate practical real life problem based learning and to then to apply new technologies and techniques to solve present and future problems, in an international arena.
- Awareness of the economic, social and ecological implications of engineering decisions and to encourage a sense of responsibility to society;

| | |
|---|---|
| | For students that progress to the MEng Level 7, a higher appreciation is required as outlined in UK-SPEC especially regarding leadership and team work. At this level you expected to have a more comprehensive understanding of science and mathematics, a greater degree of critical awareness of current societal problems, ability to collect data and undertake engineering analysis to solve complex issues, able to generate innovate and sustainable designs and have a higher generic skills ability as outlined in AHEP3.<br><br>The very nature of the integrated Masters degree prepares you as a graduate on your way to become future leaders in the industry and deliver new designs and new products contributing to solving societal problems.<br><br>**Important Course Accreditation Information**<br><br>Students completing an IET accredited degree are deemed to have met part or all of the academic requirements for registration as a Chartered or Incorporated Engineer and are in a strong position to move on to achieve professional engineering status after a period of initial professional development in industry.<br><br>**BEng Accreditation Information**<br><br>In order for you to achieve professional accreditation, you must have, on top of your academic qualifications, a minimum of 4 years relevant industrial engineering experience at the appropriate level.<br><br>Our current BEng courses are accredited at Partial CEng level, meaning that provided you have the relevant industrial experience, you may be eligible to apply for Incorporated Engineer Level.<br><br>Should you wish to apply for CEng Engineer level, there will be requirement for further learning at PG level, for example, an accredited MSc in the relevant subject. Our MSc courses are accredited at full CEng level.<br><br>**MEng Accreditation Information**<br><br>The accredited MEng will meet, in part, the exemplifying academic benchmark requirements for registration as a Chartered Engineer. Accredited MEng graduates who also have a BEng (Hons) accredited for CEng will be able to show that they have satisfied the educational base for CEng registration.<br><br>It should be noted that graduates from an accredited MEng programme that do not also have an appropriately accredited Honours degree, will not be regarded as having the exemplifying qualifications for professional registration as a Chartered Engineer with the Engineering Council; and will need to have their qualifications individually assessed through the Individual Case Procedure if they wish to progress to CEng. |

| 7 | Course Awards | | |
|---|---|---|---|
| **7a** | **Final Award for the Electronic Engineering course** | **Level** | **Credits Awarded** |
| | **For BEng (Hons):**<br>Bachelor of Engineering with Honours Electronic Engineering<br>Bachelor of Engineering with Honours Electronic Engineering With Professional Placement Year<br><br>**For MEng:**<br>Integrated Master of Engineering Electronic Engineering<br>Integrated Master of Engineering Electronic Engineering With Professional Placement Year | <br>6<br><br>6<br><br><br>7<br>7 | <br>360<br><br>480<br><br><br>480<br>600 |
| **7b** | **Exit Awards and Credits Awarded for the Electronic Engineering course** | | |
| | Certificate of Higher Education Electronic Engineering<br>Diploma of Higher Education Electronic Engineering<br>Bachelor of Engineering Electronic Engineering | 4<br>5<br>6 | 120<br>240<br>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<br>2. Compensation of marginal failure in up to 20 credits is permitted at each level<br>3. Condonement of failed modules is not permitted<br>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) with Professional Placement Year | City Centre | 4 years | US1144 |
| BEng (Hons) Part Time | City Centre | 5 years | US0718 |
| MEng Full Time | City Centre | 4 years | UM0020 |
| MEng with Professional Placement Year | City Centre | 5 years | UM0066 |
| MEng with Foundation and Professional Placement Year | City Centre | 6 years | UM0068 |

| 10 | Entry Requirements |
|---|---|

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

| 11 | Course Learning Outcomes |
|---|---|

The following table shows how the UK SPEC Learning Outcomes mapped against the 5 University's Key Themes.

| UK SPEC Learning Outcomes | | Pursuing Excellence | Practice Led Knowledge Applied | Interdisciplinary | Employability Driven | Internationalisation |
|---|---|---|---|---|---|---|
| | **A. Knowledge & Understanding** | | | | | |
| A1 | Maintain and extend a sound theoretical approach in enabling the introduction and exploitation of new and advancing technology in the field of Electronic Engineering | ☒ | ☒ | ☐ | ☒ | ☒ |
| A2 | Engage in the creative and innovative development of electronic engineering technology and continuous improvement systems. | ☒ | ☒ | ☒ | ☒ | ☐ |
| | **B. Design and Development of processes, systems, services and products** | | | | | |
| B1 | Identify potential projects and opportunities. | ☒ | ☒ | ☒ | ☒ | ☐ |
| B2 | Conduct appropriate research, and undertake design and development of engineering solutions within the design and development field. | ☒ | ☒ | ☒ | ☒ | ☐ |
| B3 | Manage implementation of design solutions, and evaluate their effectiveness. | ☒ | ☒ | ☒ | ☒ | ☐ |
| | **C. Responsibility, management and leadership** | | | | | |
| C1 | Plan for effective project implementation. | ☒ | ☒ | ☒ | ☒ | ☒ |
| C2 | Plan, budget, organise, direct and control tasks, people and resources. | ☒ | ☒ | ☒ | ☒ | ☒ |
| C3 | Lead teams and develop staff to meet changing technical and managerial needs. | ☒ | ☒ | ☒ | ☒ | ☒ |
| C4 | Bring about continuous improvement through quality management. | ☒ | ☒ | ☒ | ☒ | ☒ |
| | **D. Communication and interpersonal skills** | | | | | |
| D1 | Communicate in English with others at all levels. | ☒ | ☒ | ☐ | ☒ | ☐ |
| D2 | Present and discuss proposals. | ☒ | ☒ | ☐ | ☒ | ☐ |
| D3 | Demonstrate personal and social skills. | ☒ | ☒ | ☐ | ☒ | ☐ |
| | **E. Professional Commitment** | | | | | |
| E1 | Comply with relevant codes of conduct. | ☒ | ☒ | ☒ | ☒ | ☒ |
| E2 | Manage and apply safe systems of work. | ☒ | ☒ | ☒ | ☒ | ☐ |
| E3 | Undertake engineering activities in a way that contributes to sustainable development. | ☒ | ☒ | ☒ | ☒ | ☒ |
| E4 | Carry out and record CPD necessary to maintain and enhance competence in own area of practice | ☒ | ☒ | ☐ | ☒ | ☐ |
| E5 | Exercise responsibilities in an ethical manner. | ☒ | ☒ | ☒ | ☒ | ☒ |

The Course Learning Outcomes are articulated per each level in terms of:

- Knowledge and understanding;
- Intellectual skills;
- Practical/subject specific skills;
- Transferable skills.

At Level 4 you will illustrate your succession from familiarity and working understanding to a wider appreciation, application and deeper understanding at Level 5. At Level 6 you will illustrate your ability to independently apply knowledge, skills and understanding, with a focus on active and reflective practice and clear evidence of synthesis and integration of the various skills and knowledge acquired throughout the course. The Level 6 learning outcomes are designed for you to propose and carry out individual study courses in design and research that fully explore your analytical, creative and innovative problem solving potential. Your achievement of learning outcomes is an incremental and progressive by its nature as your advance through course of study, hence only Level 6 learning outcomes are listed below, demonstrating a threshold level of performance expected of all Honours graduates. At Level 7, a higher appreciation is required especially regarding leadership and team work. At this level you expected to have a more comprehensive understanding of science and mathematics, a greater degree of critical awareness of current societal problems, ability to collect data and undertake engineering analysis to solve complex issues, able to generate innovate and sustainable designs and have a higher generic skills abilities.

Appendix 1 shows the precise Level 4, 5, 6 and 7 modules alignment with the learning outcomes that is to be considered in terms of the overall progression through all levels of study.

**Knowledge and understanding:**

**Level 4**
On successful completion of the course you must be able to demonstrate:

- Appropriate mathematical techniques, including algebra, trigonometry, calculus, statistics and probability
- The principle of electronic engineering and their application in simple engineering science
- Understand, apply and evaluate engineering science and engineering analysis procedure to solve the engineering problems.
- Safe working practices, risk assessment;

**Level 5**

- Apply in depth Knowledge and understanding of essential facts, concepts, theories and principles of engineering, and its underpinning science and mathematics.
- A knowledge of a range of industrial computer-based design and modelling systems and their applications to modern electrical, electronic and communications systems.
- Understand the current business environment and its impact on Control and Instrumentation, including the ability to justify financial expenditure.

**Level 6**

- Project management, business management, environmental issue and ethics as applied to professional engineering.
- Critically discuss and comment upon particular aspects of current research, or equivalent advanced scholarship in this discipline

- A systematic understanding of key aspects of electrical, electronic and communications engineering including the acquisition of coherent and detailed knowledge, at least some of which is at, or informed by, the forefront of practice in electrical/electronic and communication engineering.
- Ability to deploy accurately established techniques of analysis and enquiry within the engineering discipline including solving of specific problems

**Level 7**
On successful completion of the course you must be able to demonstrate:
- The scientific principles of Electronic Engineering to an advanced level.
- Further mathematical and computer models relevant to the Electronic engineer to a comprehensive level and an appreciation of their limitations.
- Management and business practices and their limitations as applied to strategic and tactical issues as appropriate for Chartered Engineers.

**Intellectual Abilities:**

**Level 4**
On successful completion of the course you must be able to:
- Apply appropriate quantitative science and engineering tools to the analysis of problems.
- Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs.
- Comprehend the broad picture and thus work with an appropriate level of detail.
- Investigate simple electronic problem with appropriate mathematical methods.

**Level 5**
On successful completion of the course you must be able to:
- Identify and evaluate relevant practices within an appropriate professional and ethical framework
- Provide in depth analysis on information and "experiences" to formulate independent judgments and articulate through reflection, review and evaluation.
- Apply and formulate reasoned responses to the critical judgment of others and demonstrate a creative approach to complex problem solving.
- Demonstrate the application of professional development planning, review and action planning.

**Level 6**
On successful completion of the course you must be able to:
- Critical analysis of working practices to ensure safety, carry out risk assessment and apply appropriate safety management techniques
- Identify and critically evaluate relevant practices within an appropriate professional and ethical framework
- Critically evaluate arguments, assumptions, abstract concepts and data in order to make judgements and to frame appropriate questions to identify / achieve a solution to a problem.
- Apply the methods and techniques that you have learned to review, consolidate, extend and apply your knowledge and understanding, and to initiate and carry out engineering projects.

**Level 7**
On successful completion of the course you must be able to:

- Use fundamental knowledge to investigate new technologies.
- Apply advanced mathematical and computer based models for solving complex problems in engineering, and the ability to assess the limitations of particular cases.
- Extract data pertinent to an unfamiliar problem, and effect solutions using computer based engineering tools when appropriate.
- Debate contemporary issues in Electronic Engineering
- Critically discuss the importance of Electronic Engineering on a global scale

**Practical / Subject Specific skills:**

**Level 4**
On successful completion of the course you must be able to:

- Possess practical engineering skills acquired through, for example, work carried out in laboratories and workshops; in industry through supervised work experience; in individual and group project work; in design work; and in the development and use of computer software in design, analysis and control.
- Provide evidence of group working and of participation in projects.
- Apply safe working procedures, health &safety legislation, risk assessment and risk management techniques.
- Communicate effectively by written, visual and oral means.

**Level 5**
On successful completion of the course you must be able to:

- Apply advanced engineering techniques taking account of industrial and commercial constraints
- Demonstrate technical competence in a range of skills to an appropriate professional standard including Computer Integrated Control and Instrumentation.
- Solve problems working with limited or contradictory information.
- Effectively communicate and develop lifelong learning skills at an advanced level

**Level 6**
On successful completion of the course you must be able to:

- Apply project planning techniques and scheduling methods including communication of information, ideas, problems and solutions to both specialist and non-specialist audiences
- Deploy accurately established techniques of analysis and enquiry within the Engineering discipline. You will also be able to show an appreciation of the uncertainty, ambiguity and limits of knowledge within this discipline.
- Manage empirically-research based project under appropriate supervision and recognise of its theoretical, practical and methodology
- Summarise, accurately, the arguments presented in a range of complex works within and about engineering specific subject.

**Level 7**
On successful completion of the course you must be able to:

- Use wide knowledge and comprehensive understanding of design processes and methodologies and apply and adapt them in unfamiliar situations.
- Generate ground-breaking designs for products, systems, or components
- Evaluate the impact of regulatory, commercial and environmental constraints on processes and products.

**General transferable skills:**

On successful completion of the course you must be able to:

- Have developed transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT [information technology] facilities and information retrieval skills.
- Demonstrate evidence of planning, self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development].
- Communicate effectively with other people using oral, written and graphic means
- Apply safe working procedures, health & safety legislation, risk assessment and risk management techniques
- Have ability and competence in a range of skills on the current CAD and IT equipment in an effective and productive manner.
- Show initiative, work independently and able to work as member of a team to develop collaborative skills
- Display resourceful solutions including use of advanced engineering tools to the limitations of current Electronic Engineering practice and discuss them in a major technical report.

| 12 | **Course Requirements: BEng / MEng** |
|---|---|

**12a** **Level 4:**

***In order to complete this course 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 course 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 |

**Professional Placement Year (optional)**

***In order to qualify for the award of Bachelor of Engineering, Electronic Engineering with Professional Placement Year, or Integrated Masters of Engineering Electronic Engineering with Professional Placement Year, a student must successfully complete all of the modules listed as well as the following Level 5 module:***

| Module Code | Module Name | Credit Value |
|---|---|---|
| TBC | Professional Placement | 120 |

**Level 6:**

***In order to complete this course 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 |
| ENG6206 | Analogue Electronic Circuits | 20 |
| ENG6200 | Individual Honours Project | 40 |

**Level 7:**

***In order to complete this course 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

**Course 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** | | | |
| Professional Placement Year / Industrial Placement | | | 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) | Analogue Electronic Circuits (ENG6XXX) | 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 |

Course Routes:

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

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

## Part-Time Delivery - 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** | | |
| Analogue and Digital Electronics (ENG5092) | Mathematics for Signals and Systems (ENG5093) | Sem 1 |
| Microcontroller Systems Design & Programming (ENG5095) | Leading Engineering Endeavour (ENG5097) | Sem 2 |
| **Year 4** | | |
| Digital Filters and Spectral Analysis (ENG6066) | Engineering Electronic Systems (ENG5094) | Sem 1 |
| Communications Systems and Networks (ENG6068) | Electronics Project (ENG5096) | Sem 2 |
| **Year 5** | | |
| Individual Honours Project (ENG6200) | Embedded Systems and Control (ENG6067) | Sem 1 |
| | Analogue Electronic Circuits (ENG6XXX) | Sem 2 |

**Top-Up Part-Time Delivery – Electronic Engineering**

**Year 1 – Year 3**

**Accreditation of Prior Learning (APL)**
**Examples (HND; Foundation Degree, etc.)**

**Year 4**

| | | |
|---|---|---|
| Digital Filters and Spectral Analysis (ENG6066) | Embedded Systems and Control (ENG6067) | Sem 1 |
| Communications Systems and Networks (ENG6068) | Analogue Electronic Circuits (ENG6XXX) | Sem 2 |

**Year 5**

| | | |
|---|---|---|
| Individual Honours Project (ENG6200) | | Sem 1<br>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 | 55% |
| Exam | 33% |
| In-Person | 12% |

**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 | 50% |
| Exam | 42% |
| In-Person | 8% |

**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% |

# Appendix 1

# Curriculum Mapping

## Course Learning Outcomes Vs Specific Modules

| LEVEL 4<br>General Learning Outcome | Engineering Principles 1 | Mathematical Modelling 1 | Engineering Practice | Engineering Principles 2 | Mathematical Modelling 2 | Integrated Engineering project |
|---|---|---|---|---|---|---|
| **Knowledge and Understanding** | | | | | | |
| The principle of electronic engineering and their application in simple engineering science | ✓ | | ✓ | ✓ | | ✓ |
| Apply and use appropriate mathematical techniques, including algebra, trigonometry, calculus and probability. | | ✓ | | | ✓ | |
| Understand, apply and evaluate engineering science and engineering analysis procedure to solve the engineering problems. | ✓ | | ✓ | ✓ | | ✓ |
| Safe working practices, risk assessment | | | ✓ | | | ✓ |
| **Intellectual Abilities** | | | | | | |
| Apply appropriate quantitative science and engineering tools to the analysis of problems. | ✓ | ✓ | | ✓ | ✓ | |
| Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs | | | ✓ | | | ✓ |
| Comprehend the broad picture and thus work with an appropriate level of detail. | | ✓ | | | ✓ | ✓ |
| Investigate simple electronic problem with appropriate mathematical methods. | | ✓ | ✓ | | ✓ | ✓ |
| **Practical / Subject Specific skills** | | | | | | |
| Possess practical engineering skills acquired through, for example, work carried out in laboratories and workshops; in industry through supervised work experience; in individual and group project work; in design work; and in the development and use of computer software in design, analysis and control. | | ✓ | | | | ✓ |
| Provide evidence of group working and of participation in a major project is expected. However, individual professional bodies may require particular approaches to this requirement. | | ✓ | | | | ✓ |
| Apply safe working procedures, health &safety legislation, risk assessment and risk management techniques. | | ✓ | | | | ✓ |
| Communicate effectively by written, visual and oral means | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

| LEVEL 4<br><br>General Learning Outcome | Engineering Principles 1 | Mathematical Modelling 1 | Engineering Practice | Engineering Principles 2 | Mathematical Modelling 2 | Integrated Engineering project |
|---|---|---|---|---|---|---|
| **General transferable skills** | | | | | | |
| Have developed transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT [information technology] facilities and information retrieval skills. | | ✓ | ✓ | | ✓ | ✓ |
| Demonstrate evidence of planning, self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development]. | | | ✓ | | | ✓ |
| Communicate effectively with other people using oral, written and graphic means | | | ✓ | | | ✓ |
| Apply safe working procedures, health & safety legislation, risk assessment and risk management techniques | | | ✓ | | | ✓ |
| Ability to use competent in a range of skills on the current CAD and IT equipment in an effective and productive manner. | | | ✓ | | ✓ | ✓ |
| Show initiative, work independently and able to work as member of a team to develop collaborative skills | | ✓ | ✓ | | | ✓ |
| Display resourceful solutions including use of advanced engineering tools to the limitations of current Electronic Engineering practice and discuss them in a major technical report. | ✓ | | | ✓ | | |

| LEVEL 5<br><br>General Learning Outcome | Mathematics for Signals and Systems | Analogue and Digital Electronics | Engineering Electronic Systems | Microcontroller System Design and Programming | Electronics Project | Leading Engineering Endeavours |
|---|---|---|---|---|---|---|
| **Knowledge and Understanding** | | | | | | |
| Apply in depth Knowledge and understanding of essential facts, concepts, theories and principles of engineering, and its underpinning science and mathematics. | ✓ | ✓ | | ✓ | | |
| A knowledge of a range of industrial computer-based design and modelling systems and their applications to modern electrical, electronic and communications systems. | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Understand the current business environment and its impact on Control and Instrumentation, including the ability to justify financial expenditure. | | | | | ✓ | ✓ |
| **Intellectual Abilities** | | | | | | |
| Identify and evaluate relevant practices within an appropriate professional and ethical framework | | | ✓ | | ✓ | ✓ |
| Provide in depth analysis on information and “experiences” to formulate independent judgments and articulate through reflection, review and evaluation. | | | | | | ✓ |
| Apply and formulate reasoned responses to the critical judgment of others and demonstrate a creative approach to complex problem solving. | | | | | ✓ | ✓ |
| Demonstrate the application of professional development planning, review and action planning. | | | ✓ | | ✓ | ✓ |
| **Practical / Subject Specific skills** | | | | | | |
| Apply advanced engineering techniques taking account of industrial and commercial constraints | | | ✓ | | ✓ | ✓ |
| Demonstrate technical competence in a range of skills to an appropriate professional standard including Computer Integrated Control and Instrumentation. | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Solve problems working with limited or contradictory information. | | | | | | ✓ |
| Effectively communicate and develop lifelong learning skills at an advanced level | | | ✓ | | ✓ | ✓ |

| LEVEL 5<br><br>General Learning Outcome | Mathematics for Signals and Systems | Analogue and Digital Electronics | Engineering Electronic Systems | Microcontroller System Design and Programming | Electronics Project | Leading Engineering Endeavours |
|---|---|---|---|---|---|---|
| **General transferable skills** | | | | | | |
| Have developed transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT [information technology] facilities and information retrieval skills. | | | ✓ | | ✓ | ✓ |
| Demonstrate evidence of planning, self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development]. | | | ✓ | | ✓ | ✓ |
| Communicate effectively with other people using oral, written and graphic means | | | ✓ | | ✓ | ✓ |
| Apply safe working procedures, health & safety legislation, risk assessment and risk management techniques | | | ✓ | | ✓ | |
| Ability to use competent in a range of skills on the current CAD and IT equipment in an effective and productive manner. | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Show initiative, work independently and able to work as member of a team to develop collaborative skills | | | ✓ | | ✓ | ✓ |
| Display resourceful solutions including use of advanced engineering tools to the limitations of current Electronic Engineering practice and discuss them in a major technical report. | | | ✓ | | ✓ | |

| LEVEL 6<br>General Learning Outcome | Digital Filters and Spectral Analysis | Embedded Systems and Control | Communication Systems and Network | High Frequency and Power electronics | Undergraduate Individual Honours Project |
|---|---|---|---|---|---|
| **Knowledge and Understanding** | | | | | |
| Project management, business management, environmental issue and ethics as applied to professional engineering. | | | | | ✓ |
| Critically discuss and comment upon particular aspects of current research, or equivalent advanced scholarship in this discipline | | | | | ✓ |
| A systematic understanding of key aspects of electrical, electronic and communications engineering including the acquisition of coherent and detailed knowledge, at least some of which is at, or informed by, the forefront of practice in electrical/electronic and communication engineering. | ✓ | ✓ | ✓ | ✓ | |
| Ability to deploy accurately established techniques of analysis and enquiry within the engineering discipline including solving of specific problems | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Intellectual Abilities** | | | | | |
| Critical analysis of working practices to ensure safety, carry out risk assessment and apply appropriate safety management techniques | | ✓ | | ✓ | ✓ |
| Identify and critically evaluate relevant practices within an appropriate professional and ethical framework | | | | | ✓ |
| Critically evaluate arguments, assumptions, abstract concepts and data in order to make judgements and to frame appropriate questions to identify / achieve a solution to a problem. | | | | | ✓ |

| LEVEL 6<br>General Learning Outcome | Digital Filters and Spectral Analysis | Embedded Systems and Control | Communication Systems and Network | High Frequency and Power electronics | Undergraduate Individual Honours Project |
|---|---|---|---|---|---|
| Apply the methods and techniques that you have learned to review, consolidate, extend and apply your knowledge and understanding, and to initiate and carry out engineering projects. | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Practical / Subject Specific skills** | | | | | |
| Apply project planning techniques and scheduling methods including communication of information, ideas, problems and solutions to both specialist and non-specialist audiences | | ✓ | | | ✓ |
| Deploy accurately established techniques of analysis and enquiry within the Engineering discipline. You will also be able to show an appreciation of the uncertainty, ambiguity and limits of knowledge within this discipline. | ✓ | ✓ | ✓ | ✓ | |
| Manage empirically-research based project under appropriate supervision and recognise of its theoretical, practical and methodology | | | | | ✓ |
| Summarise, accurately, the arguments presented in a range of complex works within and about engineering specific subject. | ✓ | ✓ | ✓ | ✓ | ✓ |
| **General transferable skills** | | | | | |
| Have developed transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT [information technology] facilities and information retrieval skills. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Demonstrate evidence of planning, self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development]. | | | | | ✓ |
| Communicate effectively with other people using oral, written and graphic means | | ✓ | | | ✓ |
| Apply safe working procedures, health & safety legislation, risk assessment and risk management techniques | | ✓ | | | ✓ |
| Ability to use competent in a range of skills on the current CAD and IT equipment in an effective and productive manner. | ✓ | ✓ | ✓ | ✓ | ✓ |

| LEVEL 6<br>General Learning Outcome | Digital Filters and Spectral Analysis | Embedded Systems and Control | Communication Systems and Network | High Frequency and Power electronics | Undergraduate Individual Honours Project |
|---|---|---|---|---|---|
| Show initiative, work independently and able to work as member of a team to develop collaborative skills | ✓ | ✓ | ✓ | ✓ | ✓ |
| Display resourceful solutions including use of advanced engineering tools to the limitations of current Electronic Engineering practice and discuss them in a major technical report. | | | | | ✓ |

| LEVEL 7<br>General Learning Outcome | Digital Microelectronics and Hardware Description Languages | Control Engineering | Analogue Microelectronics and Integrated Circuit Architecture | Applied Digital Signal Processing | Group Integrated Masters Project |
|---|---|---|---|---|---|
| **Knowledge and Understanding** | | | | | |
| The scientific principles of Electronic Engineering to an advanced level. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Further mathematical and computer models relevant to the Electronic engineer to a comprehensive level and an appreciation of their limitations. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Management and business practices and their limitations as applied to strategic and tactical issues as appropriate for Chartered Engineers. | | | | | ✓ |
| **Intellectual Abilities** | | | | | |
| Use fundamental knowledge to investigate new technologies. | | ✓ | | | ✓ |
| Apply advanced mathematical and computer based models for solving complex problems in engineering, and the ability to assess the limitations of particular cases. | | ✓ | | ✓ | ✓ |
| Extract data pertinent to an unfamiliar problem, and effect solutions using computer based engineering tools when appropriate. | | ✓ | | | ✓ |
| Debate contemporary issues in Electronic Engineering | | | | | ✓ |
| Critically discuss the importance of Electronic Engineering on a global scale | | | | | ✓ |
| **Practical / Subject Specific skills** | | | | | |
| Use wide knowledge and comprehensive understanding of design processes and methodologies and apply and adapt them in unfamiliar situations. | | ✓ | | | ✓ |
| Generate ground-breaking designs for products, systems, or components | | ✓ | | | |
| Evaluate the impact of regulatory, commercial and environmental constraints on processes and products. | | | | | ✓ |

| LEVEL 7<br>General Learning Outcome | Digital Microelectronics and Hardware Description Languages | Control Engineering | Analogue Microelectronics and Integrated Circuit Architecture | Applied Digital Signal Processing | Group Integrated Masters Project |
|---|---|---|---|---|---|
| **General transferable skills** | | | | | |
| Have developed transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT [information technology] facilities and information retrieval skills. | | ✓ | | | ✓ |
| Demonstrate evidence of planning, self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development]. | | | | | ✓ |
| Communicate effectively with other people using oral, written and graphic means | ✓ | ✓ | ✓ | ✓ | ✓ |
| Apply safe working procedures, health & safety legislation, risk assessment and risk management techniques | ✓ | ✓ | ✓ | ✓ | ✓ |
| Ability to use competent in a range of skills on the current CAD and IT equipment in an effective and productive manner. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Show initiative, work independently and able to work as member of a team to develop collaborative skills | ✓ | ✓ | ✓ | ✓ | ✓ |
| Display resourceful solutions including use of advanced engineering tools to the limitations of current Electronic Engineering practice and discuss them in a major technical report. | | ✓ | | | ✓ |