

Programme Information		
Programme Title	Programme Code	HECoS Code
BEng Electrical and Electronic Engineering	H600	For Registry Use Only

Award	Length of Study	Mode of Study	Entry Point(s)	Total Credits	
				ECTS	CATS
BEng Electrical and Electronic Engineering ¹	3 years	Full-Time	Annually in October	180-182.5	360-365
BEng (Ordinary)	N/A	N/A	N/A	150	300
DipHE	N/A	N/A	N/A	120	240
CertHE	N/A	N/A	N/A	60	120

¹If you leave before completing the BEng Electrical and Electronic Engineering programme, you may be offered the following exit awards at the discretion of the Board of Examiners provided that you have met the minimum ECTS requirements for that award in line with College Regulations: Certificate of Higher Education in Electrical and Electronic Engineering (45 ECTS at level 4, 60 ECTS total), Diploma of Higher Education in Electrical and Electronic Engineering (45 ECTS at level 5, 120 ECTS total) or Ordinary Bachelor's Degree Electrical and Electronic Engineering (30 ECTS at level 6, 150 ECTS total). These exit awards are not accredited.

Ownership			
Awarding Institution	Imperial College London	Faculty	Faculty of Engineering
Teaching Institution	Imperial College London	Department	Electrical and Electronic Engineering
Associateship	City and Guilds of London Institute (ACGI)	Main Location(s) of Study	South Kensington

External Reference	
Relevant QAA Benchmark Statement(s) and/or other external reference points	Bachelor's Award in Electrical and Electronic Engineering
<u>FHEQ Level</u>	Level 6
<u>EHEA Level</u>	1 st Cycle

External Accreditor(s) (if applicable)			
External Accreditor 1:	Institution of Engineering and Technology		
Accreditation received:	2018	Accreditation renewal:	2025

Collaborative Provision			
Collaborative partner	Collaboration type	Agreement effective date	Agreement expiry date
N/A	N/A	N/A	N/A

Specification Details	
Programme Lead	Director of Undergraduate Studies
Student cohorts covered by specification	2023-24 entry
Date of introduction of programme	2019
Date of programme specification/revision	August 2023

Programme Overview
<p>ABOUT THE DEPARTMENT</p> <p>The Department's main objectives are to deliver high quality teaching and conduct internationally leading research. We see educating the next generation of engineers as a key role, and our graduates are highly valued by industry and commerce around the world. Our undergraduate degrees are aligned to our research strengths, and we are proud of the depth of analytical treatment and the specialised optional subjects we offer within our degree programmes. Our research feeds especially into the 4th year MEng where members of staff bring their research into the classroom and devise exercises in line with research expectations. The department carries out research across a wide range of topics, and targets both fundamental advances and practical applications of science and technology. The quality and impact of our research are demonstrated by our many highly cited publications, the personal recognition of our researchers through awards and honours, and the commercial adoption of our results and innovations.</p> <p>The Electrical and Electronic Engineering discipline is considered interdisciplinary in character because Electrical and Electronic Engineers work in a wide range of areas including renewable power and smart grids, robotics including machine learning as well as the hardware and control systems, communication systems such as 5G and signal processing, e.g. wearable medical diagnostic devices. Design and analysis of systems is at the core of this programme and you will be offered multiple opportunities to develop your skills in this area. The programme offers technical rigour and depth in a wide range of modern engineering topics. Due to our different streams and extensive list of elective modules in later years, you shape your own specialisation route.</p> <p>Further information about the Department and our courses is available on our website: www.imperial.ac.uk/electrical-engineering/about/.</p> <p>ABOUT THE BEng PROGRAMME</p> <p>The department offers both a three-year BEng programme and four-year integrated Master's MEng programme. Both degree programmes involve substantial group and individual project work. The BEng programme will prepare you to go into the employment market or to proceed with further education elsewhere. Additional features of the MEng programme (but not the BEng programme) include the opportunity to take either an industrial placement or consultancy group project. The MEng stream also offers a wider range of advanced, research-orientated elective modules in the 4th year. It is also possible for students on the MEng to spend a year abroad. For more information on the MEng stream please see the MEng programme specifications.</p> <p>This programme specification describes the academic path given in figure 1, below.</p>

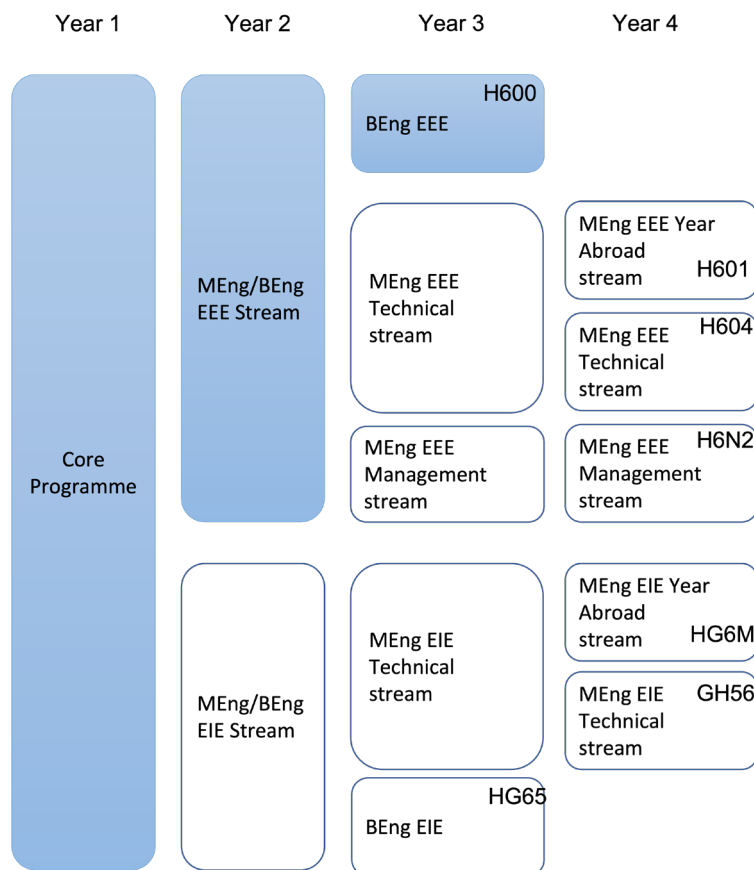


Figure 1: BEng programme structure with the different streams opening up after the 1st year. The colour filled boxes relate to this Programme Specification. For the other streams, please refer to the relevant Programme Specification.

After the first year you will have the option to transfer to the Electronic and Information Engineering (EIE) stream. Such change of stream will be allowed under certain conditions as described below in the relevant section. EEE focuses more on the physics behind electrical engineering, whilst EIE is oriented towards information processing. This document describes the EEE stream.

In the first two years you will be taught the fundamental principles in engineering. In the third year, you will be able to take advanced specialised topics, which will give you the most direct route to a specialist professional engineering career or enable you to go into further education. You will also have access to some modules offered by other engineering departments and some non-engineering topics such as management and entrepreneurship as well as languages and other modules offered by the Business School and Imperial Horizons.

In the third year of the accredited BEng degree, you will be required to complete an Individual Project.

TRANSFERRING BETWEEN PROGRAMMES

All stream changes should be discussed with your personal tutor or the senior tutor and must be approved by the Director of Undergraduate Studies.

All Programmes

All programmes within the department have a common first year. It is therefore possible to transfer between the EIE and EEE streams up until the end of your first year. The approval of such transfer is based on your performance on the related modules of the stream that you want to transfer to and an interview. To transfer from EEE to EIE you will have to perform well in ELEC40003 Digital electronics and computer architecture, and ELEC40004 Programming for engineers. To transfer from EIE to EEE you will have to perform well in ELEC40002 Analysis and design of circuits and ELEC40009 Topics in electrical engineering. You may also be invited to attend an interview that will assess your interest in the degree topic area and your motivation for wanting to change degree streams.

BEng to MEng

Year two is common between the EEE MEng and EEE BEng. You can choose at any point up until end of year two to change between MEng and BEng. If you hold a Student Route visa you will need to contact the International Office before making any stream changes at this stage.

To progress to year four of the MEng, you must have achieved a minimum of 50% overall (weighted average of years 1 to 3).

ABOUT OUR TEACHING

We use a variety of teaching methods that include large group lecture sessions, workshops, small group exercise sessions, and 3-to-1 tutorial sessions. For practical skills you will participate in laboratory sessions with a partner from the same year group, and in the group projects within a larger team of 6-7 people.

Your learning will be supported by online tools such as Blackboard for self-assessment and for-credit tests. Members of staff are experts in their field and bring their research and industrial expertise into the classroom, especially in year 3 where multiple electives are directly related to research.

Graduate and Undergraduate Teaching Assistants (GTAs and UTAs) are involved in our tutor schemes, small group teaching and laboratory teaching and will help you understand the concepts.

The BEng programme has been designed based upon a number of key principles:

- **Competence in the fundamental principles of mathematics and electrical/electronic/information engineering:** You will develop a firm grasp of the fundamental concepts and principles, be able to model complex systems analytically, and analyse and optimise these models.
- **Competence in computing:** You will acquire a high level of competence in both programming and in using the latest computing technologies.
- **Pro-active learning:** You will learn how to learn by yourself and acquire the skill and discipline of lifelong learning.
- **Design Proficiency:** You will develop your ability to incorporate new concepts into the design of new products, systems or processes in order to provide innovations.
- **Development of professional and transferrable skills:** You will learn how to work in groups, develop your ability to communicate scientific/engineering ideas orally or in written form, and to develop general problem-solving skills.
- **Flexibility of provision:** We aim to provide you with a wide variety of options in the third and fourth years of the programme in order to allow you to specialise in specific areas in electrical/electronic/computer engineering.

Benefits of accreditation

This programme is professionally accredited by the Institution of Engineering and Technology (IET) on behalf of the Engineering Council for the purposes of fully meeting the academic requirement for registration as an Incorporated Engineer and partly meeting the academic requirement for registration as a Chartered Engineer.

Achieving a professionally accredited degree demonstrates to employers that you have achieved an industry-recognised standard of competency.

Like our MEng degrees, our BEng degree counts towards the educational requirements for becoming a Chartered Engineer (CEng). A CEng is a highly respected qualification earned by professionals working in engineering, which can lead to higher earning potential and better career prospects. It also brings international recognition of your qualification, which is particularly useful for when preparing for a career abroad.

While our MEng degrees fully satisfy the educational requirements of this professional qualification, BEng graduates will need to undertake further study on graduation to demonstrate that their knowledge is at Master's degree level.

Learning Outcomes

At the end of the three-year BEng programme you will be able to:

Science and Mathematics

1. Explain the fundamental concepts, mathematical, physical principles and techniques that underpin electrical and electronic engineering in depth.
2. Solve familiar problems using established methodologies as well as deriving, adapting and applying new ones with guidance.

Engineering Analysis

3. Apply analytic principles and techniques, software engineering skills, as well as commercial software packages, to critically analyse, design, evaluate, simulate and implement electrical and electronic engineering systems, justifying approaches and recommending alternative ones in line with design criteria.
4. Interpret abstraction, critically evaluate related literature and justify the use of computational techniques, and be able to identify appropriate components to automate and optimise systems and processes.

Design

5. Communicate, interact and work with peers and professionals from other disciplines, as well as non-specialist stakeholders and manage work in terms of project plans, deliverables and costs.
6. Generate creative and innovative design for products, systems, components or processes to fulfil new needs.

Economic, legal, social, ethical and environmental context

7. Explain the role of business processes in engineering, including the commercial, societal and legal framework within which industry operates and advise stakeholders on their implications.
8. Incorporate ethical, sustainability and environmental issues into your professional conduct, and integrate these into your engineering practice. Consider the security and risk aspects of a system, and recognise the benefits of EDI.

Engineering Practice

9. Manage projects in both interdisciplinary and multidisciplinary environments by using relevant practical and laboratory skills on your own or as a member or leader of a team.
10. Design relevant systems, components or processes that meet specified industrial requirements and constraints while keeping within public health and safety, cultural, societal, and environmental constraints. Work proactively with others to formulate solutions to the implications of ethical dilemmas. Recognise the benefits of lifelong learning and plan your professional development.

Exit awards are only granted at the discretion of the Board of Examiners in line with College Regulations. None of the exit awards are accredited. Should you wish to pursue recognition as a professional electrical engineer after withdrawing, a full review of your academic history and possibly further study will be necessary to support your application for professional registration.

On completion of Year Two (Diploma in Higher Education exit award) you will be able to:

Science and Mathematics

1. Explain the fundamental concepts, mathematical, physical principles and techniques that underpin electrical and electronic engineering.
2. Solve familiar problems using established methodologies as well as deriving, adapting and applying new ones with guidance.

Engineering Analysis

3. Apply analytic principles and techniques, software engineering skills to analyse, design, implement and simulate electrical and electronic engineering systems, justifying approaches in line with design criteria.

Design

4. Communicate, interact and work with peers and professionals from other disciplines and manage work in terms of project plans, deliverables and costs.

Economic, legal, social, ethical and environmental context

5. Explain the role of business processes in engineering, including the commercial, societal and legal framework within which industry operates and advise stakeholders on their implications.
6. Have an insight into ethical, sustainability and environmental issues related to your professional conduct.

Engineering Practice

7. Manage projects by using relevant practical and laboratory skills on your own or as a member of a team.

On completion of Year One (Certificate in Higher Education exit award) you will be able to:

Science and Mathematics

1. Describe and recall the fundamental concepts, mathematical, physical principles and techniques that underpin electrical and electronic engineering.
2. Solve familiar problems using established methodologies with guidance.

Engineering Analysis

3. Apply analytic principles and techniques, software engineering skills to analyse and simulate electrical and electronic engineering systems, recognising the approaches needed in line with design criteria.

Design

4. Communicate, interact and work with peers and manage work in terms of project plans, deliverables and costs.

Economic, legal, social, ethical and environmental context

5. Recognise the need for a commercial, societal and legal framework for business processes in engineering.
6. Have an insight into ethical, sustainability and environmental issues related to your professional conduct.

Engineering Practice

7. Manage projects by using relevant practical and laboratory skills on your own or as a member in a team.

The Imperial Graduate Attributes are a set of core competencies that we expect you to achieve through completion of any Imperial College degree programme. The Graduate Attributes are available at: www.imperial.ac.uk/students/academic-support/graduate-attributes

Entry Requirements

Academic Requirement	<p>Our minimum entry standard for 2023 entry is A*A*A or A*AAA overall, to include</p> <p>A* in Mathematics A*/A in Physics (A* is required if applying with three A levels) A in a third and/or fourth subject</p> <p>Recommended subjects: Further mathematics (strongly encouraged), Chemistry, Computer Science, Computing, Design and Technology, Electronics.</p> <p>Students taking English exam board science A levels will be required to pass the practical endorsement. For non A-level students, a comparable qualification recognised by the College – e.g. for International Baccalaureate: a minimum grade of 40 overall with 7 in both Mathematics and Physics at higher level.</p> <p>For further information on entry requirements, please go to www.imperial.ac.uk/study/apply/undergraduate/entry-requirements/</p>
Non-academic Requirements	N/A
English Language Requirement	<p>Higher requirement Please check for other Accepted English Qualifications</p>
Admissions Test/Interview	<p>Admissions Tutors consider all the evidence available during our rigorous selection process and the College flags key information providing assessors with a more complete picture of the educational and social circumstances relevant to the applicant. Some applicants may be set lower offers and some more challenging ones.</p> <p>If your application passes initial screening, you'll be invited to take a 60-minute, online admissions test.</p> <p>The test will be held in November (for applications received by 15 October) and in February (for all other applications).</p> <p>The test will mostly be based on areas in mathematics and physics which you study in your final years of secondary school.</p>

We look holistically at candidates' UCAS applications and admissions test scores when deciding who to invite for interview.

Interviews will be held with academic staff between November and March.

The programme's competency standards documents can be found at:
www.imperial.ac.uk/electrical-engineering/study/undergraduate/

Learning & Teaching Approach

Teaching Delivery Methods

Your course material will be delivered in different ways, including large cohort lectures in lecture theatres, learning in smaller groups, flipped classroom approaches, workshops, video recordings for online learning and laboratory work in software, hardware and embedded systems. In addition, tutorials in groups of three to four students will support you in analysing your progress and allow you to discuss problems in a more personal environment. Work in the laboratories is carried out in small teams and will teach you experimental skills, data management and how to work with other people. Learning in a group will focus mainly on developing analytical skills in solving both well defined as well as open-ended engineering problems. You will be expected to carry out preparation work before lectures and laboratories. Revision of material is a continuous process and keeping up with new contents is key to understanding and remembering engineering concepts and how they link together.

Design and build projects

The aim of the laboratories is to add a practical aspect to the taught modules, to teach you experimental skills, including the safe use of equipment and how to choose components. It intends to encourage you to develop robust data recording and analysis skills. The labs are carried out in pairs, while design and build projects are done in a team of six to eight students. The design projects aim to bring all the taught concepts and skills together to design more complex engineering systems. These projects will allow you to fine-tune your teamwork and project management skills. The design projects are a forum to develop your creativity and innovation skills. The progress and success of your design and build project is controlled by you and your team and supported by an academic supervisor. There will be group projects in the first and second years. In the third year you will carry out an Individual Project.

Professional and transferable skills

Throughout your programme, you will also attend workshops designed to develop transferable skills (e.g. career development, team building, ethical behaviour, and report-writing and presentation skills). These will be complemented by options to develop individual interdisciplinary interests by choosing electives in Humanities, Business and Management studies and other STEM subjects from across the College. Professional Engineering is a topic that is integrated in all projects.

Independent learning

Independent study is an important part of higher education and we expect you to invest at least two to three hours of independent study for every contact hour. E-learning tools, books in the library and online digital information will support independent study. You are advised to read widely around the topic to expand your knowledge. The aim of independent study is not only to assimilate taught material but also to help you become independent learners who, after graduation, can take responsibility for their future learning and development.

Overall Workload

Your overall workload consists of face-to-face sessions and independent learning. While your actual contact hours may vary according to the optional modules you choose to study, the following gives an indication of how much time you will need to allocate to different activities at each level of the programme. At Imperial College London, each ECTS credit equates to an expected total study time of 25 hours. Of course, assimilation of new topics is different for everyone and therefore some students will need more or less time to achieve the same Learning Outcomes.

Year 1 and 2:

The ECTS allocated to each module are defined in the programme structure. Normally for 5 ECTS you will have 20 hours of lectures, 10 hours of team based learning, and 20 hours of laboratories. For every hour of face-to-face support you will be expected to spend two to three hours in self-study, supported by videos, online self-assessment, course notes and lecture hand-outs. This estimation includes tests and exam preparation time. For the laboratory, preparation/revision time will be less but you are expected to spend an hour of preparation for each hour of lab. Preparation for labs will include watching the support videos in your own time

and reading around the topic. We estimate that you will have to spend about 200 hrs on the project. The ratio of self-study to face-to-face time will increase from Year 1 to Year 3 since we expect you to develop towards becoming independent learners.

Year 3:

Normally modules have 5 ECTS with approximately 20 hours of face-to-face lecture time.

Exam assessed modules usually have extra allocated hours for revision. Video recordings support a move to a more self-learning style. Support outside the timetable is available upon request and is delivered by both the academic lead as well as the Graduate Teaching Assistants (GTAs). You are expected to spend a significant amount of time in self-study – approximately 163 hours/module.

Coursework-assessed modules are mainly carried out in groups, and GTA are available to support you with the hardware or software labs for the coursework. It is expected that a group spends an additional 163 hour/module on coursework outside the face-to-face time. Lab technicians and GTAs will be able to help you understand difficult concepts and implementations. To be successful with multiple coursework-assessed modules that run in parallel, good time management skills will be required to fulfil your obligations to deliver the coursework in time.

Members of staff define Final Year Projects (Year 3), however we encourage you to propose your own project and seek a supervisor amongst the members of staff. Industry-led projects are also allowed but you will need to take initiative to organise this and receive approval from the department. Although meetings with your supervisor are not timetabled, both you and your supervisor should mutually agree on suitable times to meet on a regular basis. The success of the outcome will mainly depend on your initiative, creativity, hard work and good communication with your supervisor or the GTA/research assistant who will be helping you.

In your third year you will take a module from our I-Explore programme. These are modules in the areas of humanities, languages and business that are offered across the whole College. I-Explore modules are designed to broaden your perspectives, give new context to your disciplinary knowledge and allow you to share your expertise for the benefit of society

Assessment Strategy

Assessment Methods

A variety of formative and summative assessment methods are utilised in this programme. Formative assessment will be conducted through different techniques, including online self-assessment, key skills assessments, tutorial sessions and other approaches that might evolve based on the developments in learning and teaching technology. Summative assessment (assessments that evaluate your understanding of engineering concepts and gives the department an insight into how well you master these). Summative assessments count towards your final degree and offer opportunities for you and your instructors to assess you level of understanding and progress on a module.

You can expect a variety of different types of assessment methods:

- On-line tests
- Written coursework
- Group working
- Hardware and software demonstrators
- Written examinations
- Oral presentations

In years 1 and 2, there is a programme of continuous assessment which is centred around mid-term exams and practical laboratory exercises. The majority of the written examination are held at the beginning of the summer term. In year 3, you will have the option to select the modules that you want to study, and the number and type of their assessments depend on your elective module choices. In year 3, written examinations for the autumn term modules takes place in December, where the spring term consists of only coursework-based assessed modules.

Balance of assessment

The following are approximate percentages based on a typical pathway through the course.

	1 st year	2 nd year	3 rd year
Coursework	15	9	43
Exam	65	70	54
Practical	20	21	3

Academic Feedback Policy

Formative feedback (unmarked)

Will be via online self-assessment opportunities, group-based-learning approaches (in class and online), comments on reports, in-class module feedback and feedback via tutorials.

Laboratory demonstrators will be available for help and give feedback during the laboratory session. For your final year project, you will receive feedback on your approach taken and progress made during an interview with your second marker at an interim stage.

Summative feedback

Will be via online assessment with automatic feedback, comments on reports and in-class module test feedback. Feedback on exams is in the form of grades and annotated example answers that will be made available after the September Examiners' Meeting. Summative feedback on laboratory orals and presentations will be provided during the sessions.

The College's Policy on Academic Feedback and guidance on issuing provisional marks to students is available at:

www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/

Re-sit Policy

The College's Policy on Re-sits is available at: www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/

Mitigating Circumstances Policy

The College's Policy on Mitigating Circumstances is available at:

www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/

Additional Programme Costs

This section should outline any additional costs relevant to this programme that are not included in students' tuition fees.

Description	Mandatory/Optional	Approximate cost
Laptop computer	Optional	The recommendation is that you bring your own laptop to join the bring-your-own-devices (BYOD) scheme. The Department runs a free laptop loan scheme for those without laptop or those who forgot to bring their laptop to College.
Computer software	Optional	The College/Department gives all you access to the required software that support the modules. In those cases where external GPU time is needed, the department runs a refund scheme.

Important notice: The Programme Specifications are the result of a large curriculum and pedagogy reform implemented by the Department and supported by the Learning and Teaching Strategy of Imperial College London. The modules, structure and assessments presented in this Programme Specification are correct at time of publication but might change as a result of student and staff feedback and the introduction of new or innovative approaches to teaching and learning. You will be consulted and notified in

a timely manner of any changes to this document when implemented in session. Updated versions will be on-line at the start of the academic year.

Programme Structure ¹					
Year 1 – FHEQ Level 4 You study all core modules.					
Code	Module Title	Core/ Compulsory/ Elective	Group*	Term	Credits
ELEC40012	Mathematics 1	Core		Autumn- Spring	15
ELEC40009	Topics in Electrical Engineering	Core		Autumn- Spring	7.5
ELEC40002	Analysis and Design of Circuits	Core		Autumn- Spring	10
ELEC40003	Digital and Computer Architecture	Core		Autumn- Spring	10
ELEC40004	Programming for Engineers	Core		Autumn- Spring	10
ELEC40006	Electronics Design Project 1	Core		Summer	7.5
Credit Total					60
Year 2 - FHEQ Level 5 You study all core modules.					
Code	Module Title	Core/ Compulsory/ Elective	Group	Term	Credits
ELEC50011	Mathematics for Engineers	Core		Autumn	5
ELEC50013	Signals and Systems	Core		Autumn	5
ELEC50007	Electromagnetism	Core		Autumn- Spring	10
ELEC50001	Circuits and Systems	Core		Autumn	7.5
ELEC50012	Power Electronics and Power Systems	Core		Spring	7.5
ELEC50002	Communications	Core		Spring	7.5
ELEC50004	Control Systems	Core		Spring	7.5
ELEC50015	Electronics Design Project 2	Core		Summer	10
Credit Total					60

¹ **Core** modules are those which serve a fundamental role within the curriculum, and for which achievement of the credits for that module is essential for the achievement of the target award. Core modules must therefore be taken and passed in order to achieve that named award. **Compulsory** modules are those which are designated as necessary to be taken as part of the programme syllabus. Compulsory modules can be compensated. **Elective** modules are those which are in the same subject area as the field of study and are offered to students in order to offer an element of choice in the curriculum and from which students are able to select. Elective modules can be compensated.

Year 3 - FHEQ Level 6

You must take the Core Individual Project Module and all Compulsory modules. You must choose 4 modules from group A and 3 from group B.

Code	Module Title	Core/ Compulsory/ Elective	Group	Term	Credits
	I-Explore	Compulsory	C	Autumn and/or Spring	5 or 7.5
ELEC60017	Individual Project	Core	P	Autumn- Summer	20
ELEC60003	Analogue Integrated Circuits and Systems	Elective	A	Autumn	5
ELEC60004	Machine Reasoning	Elective	A	Autumn	5
ELEC60005	Biomedical Electronics	Elective	A	Autumn	5
ELEC60006	Communication Networks	Elective	A	Autumn	5
ELEC60008	Control Engineering	Elective	A	Autumn	5
ELEC60010	Digital Signal Processing	Elective	A	Autumn	5
ELEC60012	Electrical Energy Systems	Elective	A	Autumn	5
ELEC60019	Machine Learning	Elective	A	Autumn	5
ELEC60021	Mathematics for Signals and Systems	Elective	A	Autumn	5
ELEC60022	Microwave Technology	Elective	A	Autumn	5
ELEC60023	Optoelectronics	Elective	A	Autumn	5
ELEC60029	Semiconductor Devices	Elective	A	Autumn	5
ELEC60002	Statistical Signal Processing and Inference	Elective	B	Spring	5
ELEC60009	Deep Learning	Elective	B	Spring	5
ELEC60011	Digital Systems Design	Elective	B	Spring	5
ELEC60033	Electric Vehicle Technologies	Elective	B	Spring	5
ELEC60013	Embedded Systems	Elective	B	Spring	5
ELEC60015	High Level Programming	Elective	B	Spring	5
ELEC60018	Instrumentation	Elective	B	Spring	5
ELEC60024	Power Electronics	Elective	B	Spring	5
ELEC60031	Principles of Classical and Modern Radar Systems	Elective	A	Autumn	5
ELEC60025	Real Time Digital Signal Processing	Elective	B	Spring	5
ELEC60030	Robotic Manipulation	Elective	B	Spring	5

Credit Total

60 or 62.5

* 'Group' refers to module grouping (e.g. a group of electives from which one/two module(s) must be chosen).

Important notice: The range of electives available in a given year is dependent on staff availability (influenced by sabbaticals, retirements and resignations). Where possible, you will be given notice of the available options ahead of making module choices.

Progression and Classification

Progression

In order to progress to the next level of study, you must have passed all modules in the current level of study at first attempt, at resit or by a compensated pass.

The overall weighted average for each year must be 40.00%, including where a module(s) has been compensated, in order for you to progress to the next year of the programme.

Compensation

Compensation is the practice of allowing marginal failure of one or more modules, on the basis of good overall academic performance. Core modules cannot be compensated.

Classification

The marks from modules in each year contribute towards the final degree classification.

In order to be considered for an award, you must have achieved the minimum number of credits at the required levels prescribed for that award and met any programme specific requirements as set out in the Programme Specification.

Your classification will be determined through:

- i) Aggregate Module marks for all modules
- ii) Year Weightings

For this award the weightings are:

Year 1	7.50%
Year 2	35.00%
Year 3	57.50%

The College sets the class of undergraduate degree that may be awarded as follows:

First	70.00% or above for the average weighted module results
Upper Second	60.00% or above for the average weighted module results
Lower Second	50.00% or above for the average weighted module results
Third	40.00% or above for the average weighted module results

Please find the full Academic Regulations at www.imperial.ac.uk/about/governance/academic-governance/regulations/. Please follow the prompts to find the set of regulations relevant to your programme of study.

Programme Specific Regulations

As an accredited degree, students on this programme are subject to the standards set by the Engineering Council in relation to compensation: a maximum of 15 ECTS credits can be compensated across the entire programme.

Supporting Information

The Programme Handbook is available at: www.imperial.ac.uk/electrical-engineering/internal/current-students-course-handbook/undergraduate-handbook/

The Module Handbook is available at: www.imperial.ac.uk/electrical-engineering/internal/current-students-course-handbook/undergraduate-handbook/

The College's entry requirements for postgraduate programmes can be found at: www.imperial.ac.uk/study/apply/postgraduate-taught/entry-requirements/

The College's Quality & Enhancement Framework is available at: www.imperial.ac.uk/registry/proceduresandregulations/qualityassurance

The College's Academic and Examination Regulations can be found at: www.imperial.ac.uk/about/governance/academic-governance/regulations

Imperial College is an independent corporation whose legal status derives from a Royal Charter granted under Letters Patent in 1907. In 2007 a Supplemental Charter and Statutes was granted by HM Queen Elizabeth II. This Supplemental Charter, which came into force on the date of the College's Centenary, 8th July 2007, established the College as a University with the name and style of "The Imperial College of Science, Technology and Medicine".

www.imperial.ac.uk/admin-services/secretariat/college-governance/charters/

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This document provides a definitive record of the main features of the programme and the learning outcomes that a typical student may reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities provided. This programme specification is primarily intended as a reference point for prospective and current students, academic and support staff involved in delivering the programme and enabling student development and achievement, for its assessment by internal and external examiners, and in subsequent monitoring and review.

Modifications

Description	Approved	Date	Paper Reference
Addition of new modules: Principles of Classical and Modern Radar	Yes - DTC	10/2019	
Clarification of 1 st year module assessment	Yes - DTC	11/2019 & 12 Feb 2020	
Major change to module organisation in year 1.	Yes - DTC	12 Feb 2020	
All other modifications are related to small changes in word use in text and re-organisation of 4 th year modules between autumn and spring term.	Chair's action	July 2020	
1 st year: ECTS for ELEC50010 and ELEC50011 originally mis-assigned. Swopped around	DUGS	March 2021	
Programme structure: list of modules updated	DUGS	July 2021	
Overall LOS updated in line with AHEP4, entry requirements updated, list of modules updated	DUGS	January 2023	