

| Programme Information | | |
|-----------------------|-----------------------|-----------------------|
| Programme Title | Programme Code | HECoS Code |
| Computing | For Registry Use Only | For Registry Use Only |

| Award BSc | Length of Study | Mode of Study | Entry Point(s) | Total Credits | |
|-----------------|-----------------|---------------|-------------------------|---------------|------|
| | | | | ECTS | CATS |
| BEng (Hons) | 3 years | Full time | October | 180 | 360 |
| BEng (Ordinary) | 3 years | Full time | *none (exit award only) | 150 | 300 |
| DipHE | 2 years | Full time | *none (exit award only) | 120 | 240 |
| CertHE | 1 year | Full time | *none (exit award only) | 60 | 120 |

Please refer to the Progression and Classification section at the end of this document for information on transferring between Computing degree programmes.

*Please note: Only the BEng degree is accredited. The DipHE and CertHE exit awards are not for entry and are unaccredited.

| Ownership | | | |
|--|---|---------------------------|-------------------------|
| Awarding Institution | Imperial College London | Faculty | Faculty of Engineering |
| Teaching Institution | Imperial College London | Department | Computing |
| Associateship | City and Guilds of London Institute (ACGI) | Main Location(s) of Study | South Kensington Campus |
| External Reference | | | |
| Relevant QAA Benchmark Statement(s) and/or other external reference points | http://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/sbs-computing-16.pdf | | |
| FHEQ Level | Level 6 | | |
| EHEA Level | 1st Cycle | | |
| External Accreditor(s) (if applicable) | | | |
| External Accreditor 1: | BCS - Chartered Institute for IT | | |
| Accreditation received: | 2017 | Accreditation renewal: | 2020 |
| External Accreditor 2: | Institute of Engineering and Technology | | |

| | | | |
|--|--------------------|--------------------------|-----------------------|
| Accreditation received: | 2017 | Accreditation renewal: | 2020 |
| Collaborative Provision | | | |
| Collaborative partner | Collaboration type | Agreement effective date | Agreement expiry date |
| N/A | N/A | N/A | N/A |
| Specification Details | | | |
| Programme Lead | | Dr. Tony Field | |
| Student cohorts covered by specification | | 2019-20 entry | |
| Date of introduction of programme | | September 19 | |
| Date of programme specification/revision | | December 18 | |

| |
|---|
| Programme Overview |
| <p>Our Computing degree programmes are designed to ensure that you will have detailed exposure to both the theoretical and practical aspects of Computing. At Imperial we see Computing as an engineering discipline where the emphasis is on building complex computer-based systems that work and are fit for purpose.</p> <p>In the first two years, there is a carefully planned programme of practical laboratory work where you will solve problems of gradually increasing size and complexity. Each problem is designed to teach a specific aspect of Computing and, at the same time, provide exposure to a range of software and hardware platforms and tools appropriate to the problem. The emphasis throughout is on instilling transferable problem-solving skills and independent learning, rather than on the teaching of specific technologies.</p> <p>The mathematical foundations of computing, which includes various topics in discrete and continuous mathematics, is taught through a series of core modules in the first two years. Follow-on modules in the third year allow you to apply the knowledge and skills gained to build and reason about computer-based systems, with key drivers being correctness, usability, security, reliability and performance.</p> <p>In the third year you will undertake a group project, which will provide you with experience of what it's like to work as part of a team. You will also have the opportunity to work with external companies and collaborators as part of the project.</p> <p>You will also undertake a major individual project spanning around eight months. This presents an exciting opportunity for you to apply the technical skills you have learnt throughout the course, under the supervision of an academic adviser. The topics covered by individual projects vary enormously, from the very theoretical to the very practical. Many projects are aligned directly with the Department's cutting-edge research activities.</p> <p>Students graduate with exceptional practical skills and with the ability to apply their extensive knowledge of key Computing principles to the engineering of complex systems that are fit for purpose, and also to academic and industrial research.</p> <p>BEng vs MEng</p> <p>The department offers both a three-year BEng programme and four-year integrated Master's MEng programme in Computing. Both degree programmes involve substantial group and individual project work. The MEng programme includes an industrial placement and also the opportunity to study more research-focused modules in the fourth year.</p> <p>The BEng programme is professionally accredited by the IET (Institution of Engineering and Technology) and the BCS (the Chartered Institute for IT).</p> <p>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 students preparing for a career abroad.</p> |

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.

All applicants for CEng status will also need to demonstrate their ability to meet competences described in the Engineering Council's UK-SPEC.

Learning Outcomes

Upon successful completion of the programme a typical BEng student will be able to:

On completion of year 1 (equivalent to a Cert HE) ...

1. Explain the basic operation of a computer.
2. Develop and test software solutions to well-specified problems using a variety of programming paradigms.
3. Describe the key characteristics of information systems and use such systems effectively for data storage and retrieval.
4. Use mathematical methods to specify and analyse the behaviour of simple programs.
5. Use continuous mathematics to solve simple problems in applied Computing.
6. Apply basic research methods and communicate findings orally and in writing.
7. Explain the social, ethical and professional principles associated with computer-based technology and act in a manner that respects those principles.

On completion of year 2 (equivalent to a Dip HE), the ILOs above and...

8. Apply software engineering design principles to the development of robust software that is easy to understand, test and maintain.
9. Design, implement and deploy web-based applications that meet the needs of their target users.
10. Specify, design and implement programming languages.
11. Explain the key principles underpinning the design of modern computer and communication systems.
12. Describe formal computational models that underpin Computing and use these to explain the limitations of computers.
13. Adhere to relevant laws that impact on the practice of computing.

On completion of the BEng, all the ILOs above and...

14. Design, engineer and extend complex computer-based systems that are fit for purpose using core Computing knowledge and appropriate state-of-the-art technology, methods and thinking.
15. Develop computer-based systems in a manner that respects relevant legal, social, ethical and other professional practices.
16. Select and apply appropriate methods, techniques and tools to ensure correctness, security, reliability, performance, and maintainability of computer-based systems.
17. Apply mathematical methods and scientific reasoning to novel computing-related problems.
18. Demonstrate effective application of Computing in scientific, engineering and industrial domains, as an individual.
19. Demonstrate effective teamwork in the management and delivery of complex projects.
20. Communicate effectively, both orally and in writing, as individuals and as part of a team.

The Imperial Graduate Attributes are a set of core competencies which we expect students 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

A-levels

Our typical A-level offer is A*AA - A*AAA with an A* in Maths. Typical offers also require STEP I/II.

For further recommendations on A-levels, see the tab on Qualification Advice for Computing. We strongly encourage applicants to take Further Maths at A2 level.

| | |
|------------------------------|---|
| | <p>We also accept the Edexcel International A levels.</p> <p>International Baccalaureate</p> <p>Our typical IB offer is 42–44 points overall with a 7 in Maths at higher level and a 7 in at least one further relevant subject at higher level. Typical offers also require STEP I/II.</p> <p>For further information on entry requirements, please go to https://www.imperial.ac.uk/study/ug/apply/requirements/ugacademic/ and the Department's admission pages at https://www.imperial.ac.uk/computing/prospective-students/courses/ug/beng-meng-computing/</p> |
| Non-academic Requirements | N/A |
| English Language Requirement | <p>Standard requirement</p> <p>Please check for other Accepted English Qualifications</p> |
| Admissions Test/Interview | All students are required to take an online admissions test that can be sat at various times throughout the admissions cycle. Applicants who are shortlisted will be invited for interview. This will normally be held at Imperial College, although there is provision for interviews to be conducted online. |

The programme's competency standards documents can be found at: <http://www.imperial.ac.uk/computing/prospective-students/courses/competence/>

Learning & Teaching Approach

Teaching

You will be taught through a combination of lectures, small-group and class-based tutorials, practical laboratory sessions and personal supervision of project work.

The first two years of the programme is made up of core modules¹. In year 1 the programming and various mathematics modules are backed up with small group tutorials in groups of approximately eight students. A senior undergraduate student will act as an Undergraduate Teaching Assistant for many of these tutorials.

The third year comprises a mixture of compulsory and elective taught modules, and a group project where you will develop a complex application as part of a team of around six students. The ability to work effectively in teams is an essential skill for any aspiring engineer and Computing is no exception. You will also undertake a substantial individual project under the supervision of a member of staff. These require you to use the skills you have learnt to develop a novel piece of software, hardware or theory, often related to a topical research problem in Computing.

There is a spine of professional and transferable skills throughout the three years which includes training in oral and written communication skills and group working, and exposure to important ethical and legal frameworks that will help to govern your activities as a practicing engineer. Your ability to communicate orally and in writing will be assessed as part of various group and individual project activities throughout the degree. When developing software systems in years 2 and 3 you will be expected to conform to relevant computer law, for example relating to software licencing and the use of personal data, and this will also form part of the assessment.

The teaching methods will vary from standard classroom teaching to more active learning, where much of what you learn will be by small-group discussions and in-class problem-solving.

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.

Independent learning

You will be expected to spend significant time on independent study outside of face to face contact time. This will typically include reading journal articles and books, undertaking research online and in the library, reviewing lecture notes and watching lecture recordings, working on individual and group projects, working on coursework assignments and revising for exams. There is also a programme of extra-curricular lectures delivered by guest speakers from industry designed to introduce you to some of the key technical challenges in Computing that are being faced by industry.

Overall Workload

Your overall workload consists of face-to-face sessions and independent learning. In the first two years you will spend approximately 20% of your time in lectures and tutorials and approximately 5% in supervised laboratory sessions. The rest of the time is dedicated to independent study. The nominal total workload amounts to 60 ECTS per year and at Imperial, each [ECTS credit](#) taken equates to an expected total study time of 25 hours, i.e. approximately 1500 hours per year.

Assessment Strategy

Assessment Methods

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

- Programming exercises
- Online programming tests
- Written coursework
- Computer-based coursework
- Written examinations
- Computer-based examinations
- Software demonstrations
- Group working
- Written reports
- Research summaries
- Oral presentations

Each examinable module comprises coursework that is designed to help you master key elements of the subject and, in part, to help prepare you for the final assessment, which is typically a written or computer-based examination.

In each of the first two years there is a substantial programme of continuous assessment, which is mostly centred around practical laboratory exercises of growing size and complexity. In the first year there are also online programming tests for each of the major programming languages you will study.

You will receive written feedback on all coursework and laboratory exercises, including online programming tests. You will also receive verbal feedback on many other aspects of your study, such as presentation and problem solving skills and your progress in group and individual projects.

Written examinations are held at the beginning of the summer term for first and second year modules and at the end of the Autumn and Spring terms for third year modules. There are also progress tests at the end of the Autumn term of the first year designed primarily to assess how well you are coping with the mathematical foundations of the subject.

The weighting of coursework varies among modules, with the normal weighting being 15% of each taught module. The various assessments allow you to demonstrate that you have met the intended learning outcomes for each module and these collectively contribute towards your achievement of the programme learning outcomes, detailed above.

Collectively, the assessments are designed to ensure that you have acquired the core knowledge and skills expected of any Computing graduate and also that you are able to use these to solve the type of real-world problems encountered by industry.

Balance of assessment

The approximate percentages below are based on a typical pathway through the course. Note that laboratory work comprises mostly independent study, although supervised laboratory sessions are also timetabled

throughout the year.

| | Year 1 | Year 2 | Year 3 |
|--------------------|--------|--------|--------|
| Coursework | 10 | 10 | 7.5 |
| Examination | 84 | 57 | 42.5 |
| Practical | 6 | 33 | 50 |

Academic Feedback Policy

Feedback will be provided in one of a number of formats, including:

- Written, e.g. in the form of specimen solutions, written and/or verbal comments on individual assignments, class-wide feedback.
- Verbal, e.g. during or after face-to-face discussions with an assessor or in a classroom feedback session.
- Peer-to-peer, e.g. from a senior undergraduate teaching assistant, or peer student
- Personal, e.g. from your personal tutor regarding your overall progress.

You will receive feedback on formative, developmental assessments and on summative coursework assessments. Feedback is normally returned within two weeks of submissions, although the turnaround time for final, i.e. summative, assessments may be longer; in those cases, you will be informed in advanced of the planned return date.

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/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/

Mitigating Circumstances Policy

The College's Policy on Mitigating Circumstances is available at: www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/

Additional Programme Costs

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

| Description | Mandatory/Optional | Approximate cost |
|-------------|--------------------|------------------|
| N/A | N/A | N/A |

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.

| Programme Structure | | | | | |
|-----------------------|---|-------------------|--------|---------|---------|
| Year 1 – FHEQ Level 4 | | | | | |
| Code | Module Title | Core/ Elective | Group* | Term | Credits |
| COMP4 0001 | Introduction to Computer Architecture | Core | N/A | 1 | 5 |
| COMP4 0002 | Mathematics 1: Foundations | Core | N/A | 1 | 5 |
| COMP4 0003 | Logic | Core | N/A | 1 | 5 |
| COMP4 0004 | Discrete Mathematics | Core | N/A | 1 | 5 |
| COMP4 0005 | Introduction to Computer Systems | Core | N/A | 2 | 5 |
| COMP4 0006 | Reasoning about Programs | Core | N/A | 2 | 5 |
| COMP4 0007 | Introduction to Databases | Core | N/A | 2 | 5 |
| COMP4 0008 | Graphs and Algorithms | Core | N/A | 2 | 5 |
| COMP4 0009 | Computing Practical 1 | Core | N/A | 1, 2, 3 | 20 |
| Credit Total | | | | | 60 |
| Year 2 – FHEQ Level 5 | | | | | |
| Code | Module Title | Core/ Elective | Group | Term | Credits |
| | Algorithm Design and Analysis | Core | N/A | 1 | 5 |
| | Software Engineering Design | Core | N/A | 1 | 5 |
| | Models of Computation | Core | N/A | 1 | 5 |
| | Operating Systems | Core | N/A | 1 | 5 |
| | Networks and Communications | Core | N/A | 2 | 5 |
| | Compilers | Core | N/A | 2 | 5 |
| | Mathematics 2: Probability and Statistics | Core | N/A | 2 | 5 |
| | Symbolic Reasoning | Core | N/A | 2 | 5 |
| | Computing Practical 2 | Core | N/A | 1, 2 | 15 |
| | Web Application Development Project | Core | N/A | 3 | 5 |
| Credit Total | | | | | 60 |

Year 3 - FHEQ Level 6

In addition to the core and compulsory modules you must select a total of six modules from the list of electives below. At most one of these can be from the Business School. The placement constitutes the equivalent of 15 ECTS of load in the third year, but this does not contribute to the final degree classification.

| Code | Module Title | Core/ Elective | Group | Term | Credits |
|------------|---|-------------------|-------|------------|---------|
| | Software Engineering Group Projects | Core | | 1 | 10 |
| | Individual Project | Core | | 1, 2, 3 | 20 |
| | I-Explore | Compul sory | | 1&/or 2 | 5 |
| | Systems Verification | Elective | | 2 | 5 |
| | Logic-Based Learning | Elective | | 2 | 5 |
| | Concurrency | Elective | | 1 | 5 |
| | Computer Vision | Elective | | 1 | 5 |
| | Computer Graphics | Elective | | 2 | 5 |
| | Custom Computing | Elective | | 2 | 5 |
| | Advanced Databases | Elective | | 1 | 5 |
| | Mathematics 3: Computational Mathematics | Elective | | 2 | 5 |
| | Computer Architecture | Elective | | 1 | 5 |
| | Communicating Computer Science in Schools | Elective | | 2 | 5 |
| | Network and Web Security | Elective | | 2 | 5 |
| | Advanced Computer Architecture | Elective | | 2 | 5 |
| | Robotics | Elective | | 1 | 5 |
| | Simulation and Modelling | Elective | | 1 | 5 |
| | Pervasive Computing | Elective | | 2 | 5 |
| | Performance Engineering | Elective | | 2 | 5 |
| | Operations Research | Elective | | 1 | 5 |
| | Distributed Algorithms | Elective | | 2 | 5 |
| | Information and Coding Theory | Elective | | 1 | 5 |
| | Type Systems for Programming Languages | Elective | | 1 | 5 |
| | Introduction to Machine Learning | Elective | | 2 | 5 |
| | Business School Modules (maximum one) | Elective | | 1 or 2 | 5 |
| ECTS Total | | | | | 60 |

Progression and Classification

Progression

In order to progress to the next level of study, you must have passed all modules (equivalent to 60 ECTS) in the current level of study at first attempt, at resit or by a compensated pass.

In addition you must have achieved at least 50.00% in Computing Practical 1 in order to progress to the second year.

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.

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, Year One is weighted at 7.50%, Year Two at 35.00% and Year Three at 57.50%.

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

- | | |
|-------------------|---|
| i) First | 70.00% or above for the average weighted module results |
| ii) Upper Second | 60.00% or above for the average weighted module results |
| iii) Lower Second | 50.00% or above for the average weighted module results |
| iv) Third | 40.00% or above for the average weighted module results |

Transferring from the BEng programme to the MEng programmes

Due to the shared core content in the first two years of all Computing degree programmes, it is possible to transfer from the BEng to an MEng programme at any point up until the beginning of the third year.

You must have achieved an overall average of 60.00% in Year Two in order to progress to the third year of one of the MEng programmes.

Please find the full Academic Regulations at <https://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 the BEng 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 College's entry requirements for postgraduate programmes can be found at:
www.imperial.ac.uk/study/pg/apply/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/

Imperial College London is regulated by the Office for Students (OfS)
www.officeforstudents.org.uk/advice-and-guidance/the-register/

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 |
|-------------|----------|------|-----------------|
| N/A | N/A | N/A | N/A |