Programme Information		
Programme Title	Programme Code	HECoS Code
Mathematics and Computer Science	GG41	For Registry Use Only

Award	Length of Study	Mode of Study	Entry Point(s)	Total Credits	
				ECTS	CATS
MEng	4 Academic years	Full-Time	Annually in October	270	480
BEng	N/A	N/A	None (exit award only)	150	360
DipHE – GG14D	N/A	N/A	None (exit award only)	120	240
CertHE – GG14C	N/A	N/A	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 Mathematics and Computer Science degree programmes.					

Ownership			
Awarding Institution	Imperial College London	Faculty	Faculty of Engineering Faculty of Natural Sciences
Teaching Institution	Imperial College London	Department	Computing Mathematics
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		Computing	
FHEQ Level		Level 7 - Master's	
EHEA Level		2nd Cycle	
External Accreditor(s) (if applicable)			
External Accreditor 1:	N/A		
Accreditation received:	N/A	Accreditation renewal:	N/A
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 Mark Wheelhouse
Student cohorts covered by specification	2024-25
Date of introduction of programme	September 19
Date of programme specification/revision	October 24

Programme Overview

With the spread of computing procedures and mathematical ideas into many areas, there is high demand for professionals who are expert in both. Our Mathematics and Computer Science degrees are mathematical courses orientated towards computing science.

We use digital technology to bring further benefits to our education programmes, drawing from investments made and skills gained during the pandemic. We deliver our education as a useful blend of face-to-face and digital learning. This will also prepare our students well for a more hybrid work culture of the future.

Taught jointly by the Departments of Computing and Mathematics, these programmes provide:

- a firm foundation in mathematics, particularly in pure mathematics, numerical analysis and statistics;
- all the essentials of computer science, with an emphasis on developing software, as well as more theoretical topics.

This makes the programme particularly suited to mathematically inclined students with interests in both subjects.

During the first two years you will take core modules from both departments and complete project work, with the chance to choose from a range of elective modules in the second year[1]. In the third and fourth year you can choose from a wide variety of elective modules offered by the departments to suit your interests.

Between year three and year four you have the opportunity to gain practical experience while on a full-time industrial placement. You will also complete a substantial individual project in either of the two departments.

About the departments

In the Department of Computing we place special emphasis on the fundamental principles underlying computing and on understanding the engineering considerations involved in computing system design, implementation and usage.

In the Department of Mathematics our teaching programme is strongly influenced by their research expertise which spans Applied Mathematics and Mathematical Physics, Mathematical Finance, Pure Mathematics and Statistics.

BEng vs MEng

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

[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.

programme has the added benefit of an industrial placement, and in your final year of your programme you will be able to choose from a range of Master's level elective modules and gain further exposure to cutting-edge research problems in computing.

Learning Outcomes

Upon successful completion of year 1 (equivalent to a Cert HE) you will be able to:

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. Appreciate the fundamentals of Mathematics as a living discipline in its own right.
6. Take a structured mathematical-analytical approach to problem solving, including the importance of assumptions made and consequences of their violation.
7. Apply basic research methods and communicate findings orally.
8. Explain the social, ethical and professional principles associated with computer-based technology and act in a manner that respects those principles.

Upon successful completion of year 2 (equivalent to a Dip HE), in addition to the ILOs above, you will be able to:

9. Apply software engineering design principles to development of robust software that is easy to understand, test and maintain.
10. Design, implement and deploy web-based applications that meet the needs of their target users.
11. Specify, design and implement programming languages.
12. Explain the key principles underpinning the design of modern computer and communication systems.
13. Apply mathematics as a language to describe and model a wide range of situations relevant to research or industry, choosing appropriate solution methods and interpreting results.
14. Take a structured mathematical-analytical approach to problem solving, including the importance of assumptions made and consequences of their violation.
15. Adhere to relevant laws that impact on the practice of computing.
16. Demonstrate effective teamwork in the management and delivery of complex projects.

Upon successful completion of the year 3, in addition to all the ILOs above, you will be able to:

17. 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.
18. Develop computer-based systems in a manner that respects relevant legal, social, ethical and other professional practices.
19. Select and apply appropriate methods, techniques and tools to ensure correctness, security, reliability, performance, and maintainability of computer-based systems.
20. Apply mathematical methods and scientific reasoning to novel computing-related problems.
21. Communicate mathematical concepts and understanding concisely and appropriately in varied situations and to diverse audiences.
22. Communicate effectively, both orally and in writing, as individuals.

Upon successful completion of the MEng, in addition to all the ILOs above, you will be able to:

23. Apply technical knowledge and expertise to cutting-edge problems in industry.
24. Demonstrate in-depth understanding of various areas of mathematics through advanced guided study as well as independent research.
25. Reflect critically on professional practice in an industrial setting.
26. Use cutting-edge research, methods and thinking to solve complex Computing problems in scientific, engineering and industrial domains, as an individual.

The Imperial Graduate Attributes are a set of core competencies which we expect students to achieve through completion of any Imperial degree programme. The Graduate Attributes are available at:

https://www.imperial.ac.uk/about/education/our-graduates/

Entry Requirements	
Academic Requirement	Admissions are handled by the Department of Computing. **A-levels** Our typical A-level offer is A*A*A or A*A*AA including A*s in Maths and Further Maths. Typical offers also require STEP II/III. For further recommendations on A-levels, see our website under Qualification Advice for Joint Maths and Computing. We also accept the Edexcel International A levels. **International Baccalaureate** Our typical IB offer is 42 points overall with a 7 in Maths at higher level and a 7 in one further relevant subject at higher level. Typical offers also require STEP II/III. For further information on entry requirements, please go to www.imperial.ac.uk/study/apply/undergraduate/entry-requirements/
Non-academic Requirements	N/A
English Language Requirement	Standard requirement Please check for other Accepted English Qualifications
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:
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 year of the programme is made up of core modules. The second year comprises a blend of core, compulsory and elective modules. 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 an assistant tutor for many of these tutorials.

The third and fourth years comprise a mixture of compulsory and elective taught modules. The ability to work effectively in teams is an essential skill for any aspiring engineer and Computing is no exception. You will have the opportunity to develop non-trivial software applications as part of a team in both the second and third years

In the fourth year you will 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 or Mathematics.

There is a spine of professional and transferable skills throughout the four 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.

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.

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 on-line 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.

Industrial placement
In the third year you will undertake a major industrial placement that lasts for at least three months (12 weeks), beginning at the end of Summer Maths exams and ending prior to the start of the fourth year. This is a formative exercise designed to give you vital experience of working as part of a team in an industrial setting.

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. 1500 hours per year.

Assessment Strategy

Assessment Methods

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

- Programming exercises
- Computer-based programming tests
- Written coursework
- Computer-based coursework
- Written examinations
- Computer-based examinations
- Software demonstrations
- 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 computer-based programming tests for each of the major programming languages you will study.

You will receive written feedback on all coursework and laboratory exercises, including computer based 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 all modules offered by the Mathematics Department. Written examinations for Computing modules in the third and fourth years are held at the end of the Autumn and Spring terms.

The weighting of coursework varies among modules, with the normal weighting being 15% in years 1 and 2, and 20% in years 3 and 4. 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.

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	Year 4
Coursework	10%	10%	83% (total coursework/ examinations)*	9%
Examinations	57%	57%		50%
Integrated laboratory	33%	33%	0%	0%
Project work	0%	0%	17%	41%

* the specific balance of coursework/examinations will depend on the module choices

Academic Feedback Policy

Feedback may 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. All feedback will be provided in a timely manner that reflects the size and complexity of the assignment and the class size; most feedback will be returned within two weeks of the work being submitted.

Imperial'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

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

Mitigating Circumstances Policy

Imperial'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 which are not included in students' tuition fees.

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

Programme Structure

Year 1 – FHEQ Level 4
You will study all core modules.

Code	Module Title	Core/ Compulsory/ Elective	Group	Term	Credits
COMP40008	Graphs and Algorithms	Core		Spring	5
COMP40009	Computing Practical 1	Core		Autumn-Summer	20
COMP40012	Logic and Reasoning	Core		Autumn-Spring	5
MATH40002	Analysis 1	Core		Autumn-Spring	10
MATH40004	Calculus and Applications	Core		Autumn-Spring	10
MATH40009	Introduction to University Mathematics (for JMC)	Core		Autumn	5
MATH40012	Linear Algebra and Groups for JMC	Core		Autumn-Spring	5
				Credit Total	60

Year 2 - FHEQ Level 5
You will study all core and compulsory modules (25 ECTS).
ALL Conditions to be satisfied for elective groups A, B, C:

- **Choose 10 ECTS points from Group A (= CO modules)**
- **Choose 25 ECTS points from Group B and C (= MA modules)**
- **Choose a minimum of 15 ECTS points from Group B (= MA core modules)**
- **Choose <u>exactly one</u> of the Year 2 group projects: COMP50010 or MATH50014**

Note: some modules in Groups A, B and C will also be made available in Year 3 (in Groups D and E)

Code	Module Title	Core/ Compulsory/ Elective	Group	Term	Credits
COMP50002	Software Engineering Design	Compulsory		Autumn	5
COMP50004	Operating Systems	Compulsory		Autumn	5
COMP50012	Computing Practical 2 for JMC	Core		Autumn-Spring	10
MATH50013	Probability and Statistics for JMC	Compulsory		Autumn	5
COMP50001	Algorithm Design and Analysis	Elective	A, D	Autumn	5
COMP50003	Models of Computation	Elective	A, D	Autumn	5
COMP50006	Compilers	Elective	A, D	Spring	5
COMP50009	Symbolic Reasoning	Elective	A, D	Spring	5

COMP50010	Year 2 Computing Group Project	Elective	A	Spring-Summer	5
MATH50012	Numerical Analysis for JMC	Elective	B, E	Autumn	5
MATH50015	Multivariable Calculus for JMC	Elective	B, E	Autumn	5
MATH50016	Linear Algebra 2 for JMC	Elective	B, E	Autumn	5
MATH50017	Real Analysis and Topology for JMC	Elective	B, E	Autumn	5
MATH50018	Complex Analysis for JMC	Elective	B, E	Autumn	5
MATH50019	Differential Equations for JMC	Elective	B, E	Autumn	5
MATH50005	Groups and Rings	Elective	C, E	Autumn	5
MATH50006	Lebesgue Measure and Integration	Elective	C, E	Spring	5
MATH50007	Network Science	Elective	C, E	Spring	5
MATH50008	Partial Differential Equations in Action	Elective	C, E	Spring	5
MATH50011	Statistical Modelling	Elective	C, E	Spring	5
MATH50014	Group Research Project in Mathematics for JMC	Elective	C	Summer	5
				Credit Total	**60**

Year 3 - FHEQ Level 6 (except those in Group B which are FHEQ level 5)
You will study all core and compulsory modules (12.5 or 15 ECTS).
ALL conditions to be satisfied for elective groups D, E, F, G, K:

- **Choose a maximum of 10 ECTS points from Groups D and E (= year 2, level 5 modules)**
- **Choose a minimum of 15 ECTS points from Groups D and F (= CO modules)**
- **Choose a minimum of 15 ECTS points from Groups E and G (= MA modules)**
- **Choose a maximum of 7.5 ECTS points from Group K (= External modules)**
- **Overall choose from groups D, E, F, G. K a minimum of 47.5 and a maximum of 50 ECTS points**

Code	Module Title	Core/ Compulsory/ Elective	Group	Term	Credits
COMP60021	Software Engineering Group Projects	Elective	F	Spring	10
COMP60030	Industrial Placement for JMC (First Part)	Core		Summer	7.5
	I-Explore	Compulsory		Autumn and/or Spring	5 or 7.5
COMP50001	Algorithm Design and Analysis	Elective	B, D	Autumn	5
COMP50006	Compilers	Elective	B, D	Spring	5
COMP50009	Symbolic Reasoning	Elective	B, D	Spring	5
COMP50003	Models of Computation	Elective	B, D	Autumn	5
COMP60001	Advanced Computer Architecture	Elective	F	Autumn	5
COMP60029	Data Processing Systems	Elective	F	Autumn	5

COMP60003	Communicating Computer Science in Schools	Elective	F	Spring	5
COMP60005	Graphics	Elective	F	Spring	5
COMP60006	Computer Vision	Elective	F	Spring	5
COMP60007	The Theory and Practice of Concurrent Programming	Elective	F	Autumn	5
COMP60008	Custom Computing	Elective	F	Spring	5
COMP60009	Distributed Algorithms (not running in 24-25)	Elective	F	Spring	5
COMP60013	Logic-Based Learning (not running in 2024-25)	Elective	F	Spring	5
COMP60015	Network and Web Security	Elective	F	Spring	5
COMP60016	Operations Research	Elective	F	Autumn	5
COMP60017	System Performance Engineering	Elective	F	Spring	5
COMP60019	Robotics	Elective	F	Spring	5
COMP60020	Simulation and Modelling (not running in 2024-25)	Elective	F	Autumn	5
COMP60023	Type Systems for Programming Languages	Elective	F	Autumn	5
COMP70040	Databases	Elective	F	Autumn	5
COMP70041	Computer Networks and Distributed Systems	Elective	F	Spring	5
COMP60012	Introduction to Machine Learning	Elective	F	Autumn	5
COMP60032	Networked Systems	Elective	F	Autumn	5
COMP60033	Computing Research Collective	Elective	F	Autumn	5
MATH50005	Groups and Rings	Elective	B, E	Autumn	5
MATH50006	Lebesgue Measure and Integration	Elective	B, E	Spring	5
MATH50007	Network Science	Elective	B, E	Spring	5
MATH50008	Partial Differential Equations in Action	Elective	B, E	Spring	5
MATH50011	Statistical Modelling 1	Elective	B, E	Spring	5
MATH50012	Numerical Analysis for JMC	Elective	B, E	Autumn	5
MATH50015	Multivariable Calculus for JMC	Elective	B, E	Autumn	5
MATH50016	Linear Algebra 2 for JMC	Elective	B, E	Autumn	5
MATH50017	Real Analysis and Topology for JMC	Elective	B, E	Autumn	5
MATH50018	Complex Analysis for JMC	Elective	B, E	Autumn	5
MATH50019	Differential Equations for JMC	Elective	B, E	Autumn	5
MATH60001	Fluid Dynamics 1	Elective	G	Autumn	7.5
MATH60002	Fluid Dynamics 2	Elective	G	Spring	7.5

MATH60003	Introduction to Geophysical Fluid Dynamics	Elective	G	Spring	7.5
MATH60004	Asymptotic Methods	Elective	G	Autumn	7.5
MATH60005	Optimisation	Elective	G	Autumn	7.5
MATH60006	Applied Complex Analysis	Elective	G	Autumn	7.5
MATH60007	Dynamics of Learning and Iterated Games	Elective	G	Autumn	7.5
MATH60008	Dynamical Systems	Elective	G	Autumn	7.5
MATH60009	Bifurcation Theory	Elective	G	Spring	7.5
MATH60010	Geometric Mechanics	Elective	G	Spring	7.5
MATH60011	Classical Dynamics	Elective	G	Autumn	7.5
MATH60012	Mathematical Finance: An Introduction to Option Pricing	Elective	G	Autumn	7.5
MATH60142	The Mathematics of Business and Economics	Elective	G	Spring	7.5
MATH60014	Mathematical Biology	Elective	G	Autumn	7.5
MATH60015	Quantum Mechanics 1	Elective	G	Autumn	7.5
MATH60016	Special Relativity and Electromagnetism	Elective	G	Autumn	7.5
MATH60017	Tensor Calculus and General Relativity	Elective	G	Spring	7.5
MATH60018	Quantum Mechanics 2	Elective	G	Spring	7.5
MATH60019	Theory of Partial Differential Equations	Elective	G	Autumn	7.5
MATH60020	Function Spaces and Applications	Elective	G	Autumn	7.5
MATH60021	Advanced Topics in Partial Differential Equations	Elective	G	Spring	7.5
MATH60022	Finite Elements: Numerical Analysis and Implementation	Elective	G	Spring	7.5
MATH60023	Computational Dynamical Systems	Elective	G	Autumn	7.5
MATH60024	Computational Linear Algebra	Elective	G	Autumn	7.5
MATH60025	Computational Partial Differential Equations	Elective	G	Spring	7.5
MATH60026	Methods for Data Science	Elective	G	Spring	7.5
MATH60028	Probability Theory	Elective	G	Autumn	7.5
MATH60029	Functional Analysis	Elective	G	Spring	7.5
MATH60030	Fourier Analysis and the Theory of Distributions	Elective	G	Spring	7.5
MATH60031	Markov Processes	Elective	G	Autumn	7.5
MATH60032	Geometry of Curves and Surfaces	Elective	G	Spring	7.5
MATH60033	Algebraic Curves	Elective	G	Autumn	7.5
MATH60034	Algebraic Topology	Elective	G	Spring	7.5

MATH60035	Algebra 3	Elective	G	Autumn	7.5
MATH60036	Group Theory	Elective	G	Autumn	7.5
MATH60037	Galois Theory	Elective	G	Autumn	7.5
MATH60038	Graph Theory	Elective	G	Autumn	7.5
MATH60039	Group Representation Theory	Elective	G	Spring	7.5
MATH60040	Formalising Mathematics	Elective	G	Spring	7.5
MATH60041	Number Theory	Elective	G	Autumn	7.5
MATH60042	Algebraic Number Theory	Elective	G	Spring	7.5
MATH60043	Statistical Theory	Elective	G	Spring	7.5
MATH60044	Applied Statistical Inference	Elective	G	Autumn	7.5
MATH60045	Applied Probability	Elective	G	Autumn	7.5
MATH60046	Time Series Analysis	Elective	G	Spring	7.5
MATH60047	Stochastic Simulation	Elective	G	Autumn	7.5
MATH60048	Survival Models	Elective	G	Spring	7.5
MATH60049	Introduction to Statistical Learning	Elective	G	Spring	7.5
MATH60130	Stochastic Differential Equations in Financial Modelling	Elective	G	Autumn	7.5
MATH60132	Mathematical Logic	Elective	G	Autumn	7.5
MATH60131	Consumer Credit Risk Modelling (not running in 2024-25)	Elective	G	Autumn	7.5
MATH60137	Mathematical Biology 2: Systems Biology	Elective	G	Spring	7.5
MATH60138	Rough Paths and Applications to Machine Learning	Elective	G	Spring	7.5
MATH60139	Spatial Statistics	Elective	G	Spring	7.5
MATH60140	Geometric Complex Analysis	Elective	G	Spring	7.5
MATH60141	Introduction to Game Theory	Elective	G	Autumn	7.5
MATH60147	Statistical Mechanics	Elective	G	Autumn	7.5
	External Module*	Elective	K	Autumn or Spring	5 or 7.5
				Credit Total	Min 60 Max 65

Year 4 - FHEQ Level 7
You will study all core modules (30 ECTS)
You must select <u>exactly one</u> individual project from Group H (20 ECTS).
ALL conditions to be satisfied for elective groups I, J, K:

- **Choose a minimum of 10 ECTS points from Group I (= CO modules)**
- **Choose a minimum of 15 ECTS points from Group J (= MA modules)**

- **Choose a maximum of 7.5 ECTS points from Group K (= External modules)**
- **Overall choose from groups I, J , K a minimum of 40 and a maximum of 42.5 ECTS points**

Code	Module Title	Core/ Compulsory/ Elective	Group	Term	Credits
COMP70012	Industrial Placement (Part 2)	Core			30
COMP70089	Computer Vision	Elective	I	Spring	5
COMP70090	Graphics	Elective	I	Spring	5
COMP70070	Custom Computing	Elective	I	Spring	5
COMP70082	Network and Web Security	Elective	I	Spring	5
COMP70086	Advanced Computer Architecture	Elective	I	Autumn	5
COMP60016	Operations Research	Elective	I	Autumn	5
COMP60023	Type Systems for Programming Languages	Elective	I	Autumn	5
COMP70050	Introduction to Machine Learning	Elective	I	Autumn	5
COMP60029	Data Processing Systems	Elective	I	Spring	5
COMP70023	Scalable Software Verification	Elective	I	Autumn	5
COMP70018	Privacy Engineering	Elective	I	Autumn	5
COMP70009	Cryptography Engineering (not running in 24-25)	Elective	I	Spring	5
COMP70022	Scalable Systems and Data	Elective	I	Autumn	5
COMP70001	Advanced Computer Graphics	Elective	I	Spring	5
COMP70006	Computational Finance (not running in 2024-25)	Elective	I	Autumn	5
COMP70028	Reinforcement Learning	Elective	I	Autumn	5
COMP70005	Complexity	Elective	I	Autumn	5
COMP70024	Software Reliability (not running in 2024-25)	Elective	I	Autumn	5
COMP70004	Advanced Computer Security	Elective	I	Spring	5
COMP70010	Deep Learning	Elective	I	Spring	5
COMP70017	Principles of Distributed Ledgers	Elective	I	Autumn	5
COMP70020	Program Analysis	Elective	I	Autumn	5
COMP70025	Software Engineering for Industry	Elective	I	Autumn	5
COMP70007	Computational Optimisation	Elective	I	Spring	5
COMP70016	Natural Language Processing	Elective	I	Spring	5
COMP70019	Probabilistic Inference (not running in 24-25)	Elective	I	Spring	5

COMP70014	Machine learning for Imaging	Elective	I	Spring	5
COMP70021	Quantum Computing	Elective	I	Autumn	5
COMP70031	Modal Logic for Strategic Reasoning	Elective	I	Spring	5
COMP70067	Robot Learning	Elective	I	Spring	5
COMP70068	Scheduling and Resource Allocation	Elective	I	Autumn	5
COMP70100	Computational Neurodynamics	Elective	I	Autumn	5
COMP70105	Deep Graph-Based Learning	Elective	I	Spring	5
COMP70101	Human-Robot Interaction (not running in 2024-25)	Elective	I	Autumn	5
COMP70098	Introduction to Concrete Complexity	Elective	I	Spring	5
COMP70103	Statistical Information Theory	Elective	I	Autumn	5
COMP70112	Non-Euclidean Methods in Machine Learning	Elective	I	Spring	5
COMP70027	Computing Individual Project (JMC MEng)	Elective	H	Autumn-Summer	20
MATH70106	Maths Individual Project (JMC MEng)	Elective	H	Spring	20
COMP60003	Communicating Computer Science in Schools	Elective	K	Spring	5
MATH70001	Fluid Dynamics 1	Elective	J	Autumn	7.5
MATH70002	Fluid Dynamics 2	Elective	J	Spring	7.5
MATH70003	Introduction to Geophysical Fluid Dynamics (not running in 24-25)	Elective	J	Spring	7.5
MATH70004	Asymptotic Methods	Elective	J	Autumn	7.5
MATH70005	Optimisation	Elective	J	Autumn	7.5
MATH70006	Applied Complex Analysis	Elective	J	Autumn	7.5
MATH70007	Dynamics of Learning and Iterated Games	Elective	J	Autumn	7.5
MATH70008	Dynamical Systems (not running in 24-25)	Elective	J	Autumn	7.5
MATH70009	Bifurcation Theory	Elective	J	Spring	7.5
MATH70010	Geometric Mechanics	Elective	J	Spring	7.5
MATH70011	Classical Dynamics	Elective	J	Autumn	7.5
MATH70012	Mathematical Finance: An Introduction to Option Pricing	Elective	J	Autumn	7.5
MATH70013	Advanced Simulation Methods	Elective	J	Spring	5
MATH70014	Mathematical Biology	Elective	J	Autumn	7.5
MATH70015	Quantum Mechanics 1	Elective	J	Autumn	7.5
MATH70016	Special Relativity and Electromagnetism	Elective	J	Autumn	7.5

MATH70017	Tensor Calculus and General Relativity	Elective	J	Spring	7.5
MATH70018	Quantum Mechanics 2	Elective	J	Spring	7.5
MATH70019	Theory of Partial Differential Equations	Elective	J	Autumn	7.5
MATH70020	Function Spaces and Applications	Elective	J	Autumn	7.5
MATH70021	Advanced Topics in Partial Differential Equations	Elective	J	Spring	7.5
MATH70022	Finite Elements: Numerical Analysis and Implementation	Elective	J	Spring	7.5
MATH70023	Computational Dynamical Systems	Elective	J	Autumn	7.5
MATH70024	Computational Linear Algebra	Elective	J	Autumn	7.5
MATH70025	Computational Partial Differential Equations	Elective	J	Spring	7.5
MATH70026	Methods for Data Science	Elective	J	Spring	7.5
MATH70028	Probability Theory	Elective	J	Autumn	7.5
MATH70029	Functional Analysis	Elective	J	Spring	7.5
MATH70030	Fourier Analysis and the Theory of Distributions	Elective	J	Spring	7.5
MATH70031	Markov Processes	Elective	J	Autumn	7.5
MATH70032	Geometry of Curves and Surfaces	Elective	J	Spring	7.5
MATH70033	Algebraic Curves	Elective	J	Autumn	7.5
MATH70034	Algebraic Topology	Elective	J	Spring	7.5
MATH70035	Algebra 3	Elective	J	Autumn	7.5
MATH70036	Group Theory	Elective	J	Autumn	7.5
MATH70037	Galois Theory	Elective	J	Autumn	7.5
MATH70038	Graph Theory	Elective	J	Autumn	7.5
MATH70039	Group Representation Theory	Elective	J	Spring	7.5
MATH70040	Formalising Mathematics	Elective	J	Spring	7.5
MATH70041	Number Theory	Elective	J	Autumn	7.5
MATH70042	Algebraic Number Theory	Elective	J	Spring	7.5
MATH70043	Statistical Theory	Elective	J	Spring	7.5
MATH70044	Applied Statistical Inference	Elective	J	Autumn	7.5
MATH70045	Applied Probability	Elective	J	Autumn	7.5
MATH70046	Time Series Analysis	Elective	J	Autumn	7.5
MATH70047	Stochastic Simulation	Elective	J	Autumn	7.5
MATH70048	Survival Models	Elective	J	Spring	7.5

MATH70049	Introduction to Statistical Learning	Elective	J	Spring	7.5
MATH70051	Vortex Dynamics	Elective	J	Spring	7.5
MATH70052	Hydrodynamic Stability	Elective	J	Spring	7.5
MATH70053	Random Dynamical Systems and Ergodic Theory	Elective	J	Spring	7.5
MATH70054	Introduction to Stochastic Differential Equations and Diffusion Processes	Elective	J	Autumn	7.5
MATH70055	Stochastic Calculus and Applications to Non-Linear Filtering	Elective	J	Spring	7.5
MATH70056	Algebraic Geometry	Elective	J	Spring	7.5
MATH70057	Riemannian Geometry	Elective	J	Spring	7.5
MATH70058	Manifolds	Elective	J	Autumn	7.5
MATH70059	Differential Topology	Elective	J	Spring	7.5
MATH70060	Complex Manifolds	Elective	J	Spring	7.5
MATH70061	Commutative Algebra	Elective	J	Autumn	7.5
MATH70062	Lie Algebras	Elective	J	Autumn	7.5
MATH70063	Algebra 4	Elective	J	Spring	7.5
MATH70064	Elliptic Curves	Elective	J	Autumn	7.5
MATH70070	Advanced Statistical Finance	Elective	J	Spring	5
MATH70083	Statistical Genetics and Bioinformatics	Elective	J	Spring	5
MATH70090	Bayesian Methods (not running in 2024-25)	Elective	J	Spring	5
MATH70091	Machine Learning	Elective	J	Spring	5
MATH70092	Multivariate Analysis (not running in 2024-25)	Elective	J	Spring	5
MATH70131	Consumer Credit Risk Modelling (not running in 2024-25)	Elective	J	Autumn	7.5
MATH70130	Stochastic Differential Equations in Financial Modelling	Elective	J	Autumn	7.5
MATH70134	Mathematical Foundations of Machine Learning	Elective	J	Spring	7.5
MATH70135	Analytic Methods in Partial Differential Equations	Elective	J	Spring	7.5
MATH70132	Mathematical Logic	Elective	J	Spring	7.5
MATH70137	Mathematical Biology 2: Systems Biology	Elective	J	Spring	7.5
MATH70138	Rough Paths and Applications to Machine Learning	Elective	J	Spring	7.5
MATH70139	Spatial Statistics	Elective	J	Spring	7.5
MATH70140	Geometric Complex Analysis	Elective	J	Spring	7.5
MATH70141	Introduction to Game Theory	Elective	J	Autumn	7.5

MATH70142	The Mathematics of Business and Economics	Elective	J	Spring	7.5
MATH70143	Dynamics, Symmetry and Integrability (not running in 2024-25)	Elective	J	Spring	7.5
MATH70146	Advanced Dynamical Systems	Elective	J	Spring	7.5
MATH70147	Statistical Mechanics	Elective	J	Autumn	7.5
	External Module*	Elective	K	Autumn or Spring	5 or 7.5
				Credit Total	Min 90 Max 92.5

*In Years 3 and 4, one technical module from another Imperial degree programme may be allowed with the permission of the JMC Director. Additional details on this scheme can be found on the DoC External Module Approvals Wiki page. The above list of elective modules is indicative and subject to additional constraints preventing the selection of modules whose contents or ILOs are deemed to have a significant overlap. In the event that an elective module is suspended or discontinued, we will communicate the changes to you. Further information can be found at: www.imperial.ac.uk/study/apply/course-changes/

Progression and Classification

Progression

In order to progress to the next level of study, you must have passed all modules (normally equivalent to **60 ECTS** each in the first two years and **45 ECTS** in the third year) either at first attempt, at resit or by a compensated pass.

In addition:

i) In order to progress to the second year, Computing Practical 1 must normally be passed either at the first attempt or having re-sat one or more components in the summer at the end of the first year. In addition to the normal 40% pass mark for Computing Practical 1, students must also have a weighted average of at least 50% in all of its Programming Tests and 40% on the Term 3 Group Project. An overall weighted average of at least 60.00% is needed in the second year in order to progress to the third year. Students who fail to achieve this will normally be required to transfer to the third year of the BEng programme.

The overall weighted average for each year must be 40.00% or above, including where a module(s) has been compensated, in order for you to progress to the next year of the programme. For the final year, the overall weighted average must be 50% or above.

Resits

With the exception of Computing Practical 1 and 2, students will normally be offered two resit opportunities per module. The first is normally in the summer at the end of the academic year in question; the second is normally in the following academic year.

Classification

The marks from modules in each year contribute towards the final degree classification. The industrial placement is PASS/FAIL and does not contribute to the final degree assessment.

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

This is known as the Programme Overall Weighted Average.

For this award, Year One is weighted at 7.50%, Year Two at 20.00% and Years Three and Four at 36.25%.

The university 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

Transferring from the MEng programme to the BEng programmes

Due to the shared core content in the first two years of all Mathematics and Computer Science degree programmes, it is possible to transfer from the MEng to the BEng programme. This is only permitted during a short period, usually at the beginning of the third year.

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

N/A

Supporting Information
The Programme Handbook is available at: Computing handbook and Maths handbook
The Module Handbook is available at: Computing modules and Maths modules (MathsCentral)
Imperial's entry requirements for postgraduate programmes can be found at: www.imperial.ac.uk/study/apply/postgraduate-taught/entry-requirements/
Imperial's Quality & Enhancement Framework is available at: www.imperial.ac.uk/registry/proceduresandregulations/qualityassurance
Imperial's Academic and Examination Regulations can be found at: www.imperial.ac.uk/about/governance/academic-governance/regulations
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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 you may reasonably be expected to achieve and demonstrate if you take 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.