BSc/MSci Mathematics and Physics for 23/24

All modules are worth 15 credits unless stated otherwise. 120 credits are taken each year. All modules are at level 4, 5, 6 or 7, corresponding roughly to years 1, 2, 3 and 4.

During all years of the degree, you must take a maximum of 150 credits at Level 4. To graduate with the BSc, you must take a minimum of 90 credits at Level 6 or above during your degree. To graduate with the MSci, you must take a minimum of 120 credits at Level 7 during your degree.

Please note that the choice of optional modules available may vary slightly from year to year and is subject to approval by the Mathematics Departmental Tutor and, in the case of modules from other departments, also to approval from that department.

YEAR 1

All modules are compulsory and at Level 4

Term 1		*Term 2*	
MATH0003	Analysis 1	MATH0007	Algebra for Joint Honours Students
MATH0010	Mathematical Methods 1	MATH0011	Mathematical Methods 2
PHAS0004	Atoms, Stars and the Universe	PHAS0005	Waves, Optics and Acoustics
PHAS0010	Classical Mechanics	PHAS0006	Thermal Physics

YEAR 2

The modules below are compulsory and at Level 5 unless otherwise specified

Term 1		*Term 2*	
MATH0013	Analysis 3: Complex Analysis	MATH0056	Mathematical Methods 4 (L 6)
MATH0015	Fluid Mechanics	PHAS0023	Atomic and Molecular Physics
MATH0016	Mathematical Methods 3	PHAS0024	Statistical Physics of Matter
PHAS0021	Electricity and Magnetism		
PHAS0022	Quantum Physics		

YEAR 3 (BSc/MSci)

General guidance

BSc/MSci degree. You should ensure that you take enough units at level 6 or 7: in order to graduate with the BSc degree, a minimum of 90 credits, from all years, must be taken at level 6 or 7. At most 15 credits of outside options may be taken. Most students choose most of their options from the list of level 6 mathematics and physics modules. You should be aware that the level 7 modules will be more demanding and have a 50% pass mark.

MSci degree. In addition to the above, you are also recommended to take at least one and probably two of the level 7 modules, as in order to graduate with the MSci you must take at least 120 credits at level 7. You should also choose your modules carefully in the light of which modules you will take in year 4, and which project you will pursue. Please take advice and look at the module pathways information.

1. Choose three modules (45 credits) from the following four optional modules, each at Level 6

Term 1		*Term 2*	
PHAS0038	Electromagnetic Theory	PHAS0040	Nuclear & Particle Physics
PHAS0042	Quantum Mechanics	PHAS0041	Solid State Physics

2. Choose 30 credits (two modules) from Mathematics Year 3 options
3. Choose up to 45 credits from the following collections of modules:
    a. Mathematics all options
    b. Physics options
    c. Outside options (maximum 15 credits)

2. Mathematics Year 3 options

Term 1		*Term 2*	
Mathematics Year 3 options			
MATH0025	Mathematics for General Relativity	MATH0020	Differential Geometry
MATH0026	Biomathematics	MATH0024	Geophysical Fluid Dynamics
MATH0029	Graph Theory and Combinatorics	MATH0027	Mathematical Methods 5
MATH0030	Mathematical Ecology	MATH0028	Combinatorial Optimisation
MATH0032	Introduction to Mathematica	MATH0031	Financial Mathematics
MATH0033	Numerical Methods	MATH0037	Logic
MATH0077	Real Fluids (L7)	MATH0038	History of Mathematics
MATH0106	Industrial and Geological Fluids (L7)	MATH0054	Analytic Dynamics
		MATH0079	Cosmology (L7)
		MATH0080	Waves and Wave Scattering (L7)
		MATH0102	Applied Stochastic Methods (L7)

3.(a) Mathematics all options

Term 1		*Term 2*	
CPAS0012	Mathematical Education for Physical and Mathematical Sciences	MATH0020	Differential Geometry
MATH0025	Mathematics for General Relativity	MATH0024	Geophysical Fluid Dynamics
MATH0026	Biomathematics	MATH0027	Mathematical Methods 5
MATH0029	Graph Theory and Combinatorics	MATH0028	Combinatorial Optimisation
MATH0030	Mathematical Ecology	MATH0031	Financial Mathematics
MATH0032	Introduction to Mathematica	MATH0037	Logic
MATH0033	Numerical Methods	MATH0038	History of Mathematics
MATH0077	Real Fluids (L7)	MATH0054	Analytic Dynamics

MATH0106	Industrial and Geological Fluids (L7)	MATH0079	Cosmology (L7)
STAT0005	Probability and Statistics II	MATH0080	Waves and Wave Scattering (L7)
		MATH0102	Applied Stochastic Methods (L7)
		MATH0034	Number Theory (L5)
		MATH0051	Analysis 4: Real Analysis
		MATH0052	Geometry and Groups (L5)
		MATH0053	Algebra 4: Groups and Rings
		MATH0057	Probability and Statistics (L5)
		MATH0058	Computational Methods (L5)
		STAT0007	Stochastic Processes
		STAT0011	Decision and Risk

(b) Physics options

Term 1		*Term 2*	
PHAS0038	Electromagnetic Theory	PHAS0037	Physical Cosmology
PHAS0042	Quantum Mechanics	PHAS0040	Nuclear & Particle Physics
PHAS0049	Theory of Dynamical Systems	PHAS0041	Solid State Physics
PHAS0057	Physics of the Earth	PHAS0050	Climate and Energy

(c) Year 3 Outside options (at most 15 credits)

If you wish you can choose up to 15 credits of outside options, i.e. modules from other departments, you should first check information with the relevant department, including pre-requisites and registration procedures. No adjustment can be made to timetables for outside options.

The modules which appear here have been taken by Maths students in the past and most are likely to be reasonably suitable. However, there is no guarantee you can take them and they still require approval from the teaching department. Please note that if you are in year 4, you can only take outside options at Level 6 or 7. In year 3, if you choose a module at level 4 or 5 you need to make sure that you are still following the degree rules on number of credits at a given level. If you wish to take an outside option which does not appear on this list, then you should contact the Mathematics Departmental Tutor to discuss.

Year 3 Standard outside options (Updated for 23/24: also updated on portico on BSc Maths with Mans)

BENG0019	Engineering Mathematics in Finance	(Term 2: level 5)
COMP0015	Introduction to Programming	(Term 1 or 2: Level 5)

COMP0142	Machine Learning for Domain Specialists	(Term 2: Level 6)
ECON0008	History of Economic Thought	(Term 1: Level 4)
ECON0011	Basic Microeconomic Concepts	(Term 2: Level 4)
ECON0027	Game Theory	(Term 1: Level 6)
ECON0044	An Introduction to Applied Economic Analysis	(Term 1: Level 4)
INST0002	Programming 1	(Term 2: Level 4)
INST0060	Foundations of Machine Learning	(Term 1: Level 7)
LC*	Language Centre modules	(Term 1 **and** 2: various levels)
MSIN0004	Accounting for Business	(Term 1 or 2: Level 4)
MSIN0048	Understanding Management	(Term 1 or 2: Level 4)
MSIN0059	Managerial Accounting for Decision Making	(Term 1 or 2: Level 5)
MSIN0146	Financial Management	(Term 1: Level 6)
STAT0025	Optimisation Algorithms in Operational Research	(Term 1: level 6)

These modules are expected to be offered in 2023-24 but this is not guaranteed and there is no guarantee you will be able to get a place. Please check term.

YEAR 4 (MSci)

1. You choose

EITHER

(a) The 30 credit Mathematics project MATH0084 **and** 15 credits from the Standard Year 4

Mathematics options

OR

(b) The 45 credit Physics project PHAS0097

2. Then you also choose 75 credits (5 modules) from the following list of options as follows

(i) Between 30 and 45 credits of Year 4 Mathematics options

(ii) Between 30 and 45 credits of Year 4 Physics options

(iii) Between 0 and 15 credits of outside options/year 3 maths option

All modules taken must be at level 6 or 7, and you should be aware you need to take 120 credits at level 7 to graduate with the MSci.

Year 4 Mathematics options (level 7)

Term 1		*Term 2*	
MATH0065	Advanced Modelling Mathematical Techniques	MATH0073	Representation Theory
MATH0075	Lie Groups and Lie Algebras	MATH0078	Asymptotic Approximation Methods
MATH0077	Real Fluids	MATH0079	Cosmology
MATH0086	Computational and Simulation Methods	MATH0080	Waves and Wave Scattering

MATH0106	Industrial and Geological Fluids	MATH0082	Evolutionary Games and Population Genetics
		MATH0088	Quantitative and Computational Finance
		MATH0102	Applied Stochastic Methods

Year 4 Physics options

Term 1		*Term 2*	
PHAS0069	Advanced Quantum Theory	PHAS0061	Advanced Topics in Statistical Mechanics
PHAS0072	Particle Physics	PHAS0070	Quantum Computation and Communication
		PHAS0073	Quantum Field Theory

Year 4 Outside options or 3rd year Mathematics modules (at most 15 credits)

If you wish you can choose up to 15 credits of outside options, i.e. modules from other departments, or 3rd year Mathematics modules. If taking a module from another department, you should first check information, including pre-requisites and registration procedures. No adjustment can be made to timetables for outside options.

The modules which appear here have been taken by Maths students in the past and most are likely to be reasonably suitable. However, there is no guarantee you can take them and they still require approval from the teaching department. Please note that you can only take outside options at Level 6 or 7 and you should make sure that you have a total of at least 120 credits at level 7 from this and previous years. If you wish to take an outside option which does not appear on this list, then you should contact the Mathematics Departmental Tutor to discuss.

Year 4 Standard outside options

COMP0142	Machine Learning for Domain Specialists	(Term 2: Level 6)
ECON0027	Game Theory	(Term 1: Level 6)
INST0060	Foundations of Machine Learning	(Term 1: Level 7)
LC*	Language Centre modules	(Term 1 **and** 2: level 7)
MSIN0146	Financial Management	(Term 1: Level 6)
STAT0025	Optimisation Algorithms in Operational Research	(Term 1: level 6)

These modules are expected to be offered in 2023-24 but this is not guaranteed and there is no guarantee you will be able to get a place. Please check term.

Term 1		*Term 2*	

Mathematics Year 3 options			
MATH0025	Mathematics for General Relativity	MATH0020	Differential Geometry
MATH0026	Biomathematics	MATH0024	Geophysical Fluid Dynamics
MATH0029	Graph Theory and Combinatorics	MATH0027	Mathematical Methods 5
MATH0030	Mathematical Ecology	MATH0028	Combinatorial Optimisation
MATH0032	Introduction to Mathematica	MATH0031	Financial Mathematics
MATH0033	Numerical Methods	MATH0037	Logic
		MATH0038	History of Mathematics
		MATH0054	Analytic Dynamics