



UCL Department of Mathematics

Specific Detailed Degree Structure 2021-2022

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BSc/MSci Mathematics

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	MATH0004	Analysis 2
MATH0005	Algebra 1	MATH0006	Algebra 2
MATH0008	Applied Mathematics 1	MATH0009	Newtonian Mechanics
MATH0010	Mathematical Methods 1	MATH0011	Mathematical Methods 2

YEAR 2

Term 1

The modules below are compulsory and are at Level 5

MATH0013 Analysis 3: Complex Analysis
MATH0014 Algebra 3: Further Linear Algebra
MATH0015 Fluid Mechanics
MATH0016 Mathematical Methods 3

Term 2

All students (BSc/MSci)

Choose four modules (60 credits) from the Year 2 options listed below. Your choice of options in the second year has a large impact on what can be chosen in the third year (and fourth year for MSci students): you should look at the third/fourth year options (below) and the module pathways information to help you choose.

MSci students

MSci students are advised to take four mathematics options, i.e. not to take an outside option, and also to look carefully at the year 3/4 structure to see the implications for your choice of modules in Year 2.

Year 2 options (term 2)

MATH0034 Number Theory (Level 5)
MATH0051 Analysis 4: Real Analysis (Level 6)
MATH0052 Geometry and Groups (Level 5)
MATH0053 Algebra 4: Groups and Rings (Level 6)
MATH0055 Electromagnetism (Level 5)
MATH0056 Mathematical Methods 4 (Level 6)
MATH0057 Probability and Statistics (Level 5)
MATH0058 Computational Methods (Level 5)

Outside option (15 credits)

If you wish to choose an outside option, i.e. a 15 credit module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are eligible to take the module from the point of view of the teaching department. All outside options need to be approved by the Mathematics Departmental Tutor. Although outside options are normally taken in term 2, it is possible to take an outside option in term 1 or through terms 1 and 2 if the timetable works.

YEAR 3

All students (BSc/MSci)

You select 120 credits (normally 8 modules) from the list of modules below which include all standard year 3 Mathematics options, some year 4 Mathematics options, year 2 Mathematics options not previously taken, three standard Statistics options and the Maths Education module. [From the point of view of BSc students, which modules are in groups 1A, 1B and 2 is irrelevant, although if you wish to keep open the possibility of switching to the MSci, you should follow the MSci rules.] You may substitute up to 30 credits of these with outside option(s), subject to approval. 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.

There is no strict rule on how many options you take in each term, but you are advised to choose either a 4:4 or a 5:3 distribution.

MSci students

In addition to the rules above, you must choose one of the three groups 1A, 1B and 2 and choose at least four modules from that group. To give you some flexibility in year 4, it is also probably a good idea to include at least one module at level 7 this year: to graduate with the MSci you must take at least 120 credits at level 7 during your degree. 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.

LIST OF MODULES

All modules are at level 6 unless otherwise specified. Level 7 modules are likely to be harder and have a 50% pass mark.

Term 1		Term 2	
Main Year 3 Mathematics options			

MATH0017	Measure Theory	MATH0018	Functional Analysis
MATH0019	Multivariable Analysis	MATH0020	Differential Geometry
MATH0022	Galois Theory	MATH0021	Commutative Algebra
MATH0023	Algebraic Topology	MATH0024	Geophysical Fluid Dynamics
MATH0025	Mathematics for General Relativity	MATH0027	Mathematical Methods 5
MATH0026	Biomathematics	MATH0028	Combinatorial Optimisation
MATH0029	Graph Theory and Combinatorics	MATH0031	Financial Mathematics
MATH0030	Mathematical Ecology	MATH0035	Algebraic Number Theory
MATH0032	Introduction to Mathematica	MATH0036	Elliptic Curves
MATH0033	Numerical Methods	MATH0037	Logic
MATH0070	Linear Partial Differential Equations (L7)	MATH0038	History of Mathematics
MATH0074	Topology and Groups (L7)	MATH0054	Analytical Dynamics
MATH0075	Lie Groups and Lie Algebras (L7)	MATH0069	Probability (L7)
MATH0077	Real Fluids (L7)	MATH0073	Representation Theory (L7)
MATH0083	Prime Numbers and their Distribution (L7)	MATH0080	Waves and Wave Scattering
		MATH0090	Elliptic PDEs (L7)
		MATH0092	Variational Methods for PDEs (L7)
		MATH0102	Applied Stochastic Methods (L7)
		MATH0104	Modular Forms (L7)
Stats modules and Maths Education [Note: Although these are counted as Mathematics options, you will need to register with Statistics/IOE and acceptance is not guaranteed]			
STAT0005	Probability and Statistics II	STAT0007	Stochastic Processes
CPAS0012	Mathematical Education for Physical and Mathematical Sciences	STAT0011	Decision and Risk
Mathematics options from Year 2			
		MATH0034	Number Theory (L5)
		MATH0051	Analysis 4: Real Analysis
		MATH0052	Geometry and Groups (L5)
		MATH0053	Algebra 4: Groups and Rings
		MATH0055	Mathematics of EM and Special Relativity (L5)
		MATH0056	Mathematical Methods 4
		MATH0057	Probability and Statistics (L5)
		MATH0058	Computational Methods (L5)

Outside options (at most 30 credits)

You can choose up to 30 credits of outside options. If you wish to choose an outside option, i.e. a module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are likely to be accepted. This information can often be found on the departmental web-site. Outside options are subject to approval by the Maths Dept Departmental Tutor and cannot be taken into account in the timetable.

Groups of modules for MSci students

Group 1A Analysis/PDEs

MATH0017	Measure Theory	MATH0018	Functional Analysis
MATH0019	Multivariable Analysis	MATH0020	Differential Geometry
MATH0029	Graph Theory and Combinatorics	MATH0069	Probability (L7)
MATH0070	Linear Partial Differential Equations (L7)	MATH0090	Elliptic PDEs (L7)
MATH0083	Prime Numbers and their Distribution (L7)	MATH0092	Variational Methods for PDEs (L7)

Group 1B Algebra/Number Theory

MATH0022	Galois Theory	MATH0021	Commutative Algebra
MATH0023	Algebraic Topology	MATH0035	Algebraic Number Theory
MATH0029	Graph Theory and Combinatorics	MATH0036	Elliptic Curves
MATH0083	Prime Numbers and their Distribution (L7)	MATH0073	Representation Theory (L7)
		MATH0104	Modular Forms (L7)

Group 2 Applied/Applicable Mathematics/Methods

MATH0025	Mathematics for General Relativity	MATH0024	Geophysical Fluid Dynamics
MATH0026	Biomathematics	MATH0027	Mathematical Methods 5
MATH0030	Mathematical Ecology	MATH0028	Combinatorial Optimisation
MATH0033	Numerical Methods	MATH0092	Variational Methods for PDEs (L7)
MATH0077	Real Fluids (L7)	MATH0102	Applied Stochastic Methods (L7)

YEAR 4 (MSci)

The following module is compulsory and is worth 30 credits

MATH0084 Project (level 7)

As well as the 30-credit project, you should choose 90 credits from the list of Standard Year 4 Mathematics options below. It is possible to substitute up to 30 credits of these by suitable outside options or third year mathematics options, but all modules taken must be at level 6 or 7, and you should be aware that you need to take 120 credits at level 7 (during your entire degree) to graduate with the MSci.

Standard Year 4 Mathematics options (level 7)

Term 1		Term 2	
MATH0070	Linear Partial Differential Equations	MATH0069	Probability
MATH0071	Spectral Theory	MATH0090	Elliptic PDEs
MATH0083	Prime Numbers and their Distribution	MATH0092	Variational Methods for PDEs
MATH0072	Riemannian Geometry	MATH0073	Representation Theory
MATH0074	Topology and Groups	MATH0104	Modular Forms
MATH0075	Lie Groups and Lie Algebras		
MATH0076	Algebraic Geometry		
MATH0083	Prime Numbers and their Distribution		
MATH0065	Advanced Modelling Mathematical Techniques	MATH0078	Asymptotic Approximation Methods
MATH0077	Real Fluids	MATH0079	Cosmology
MATH0086	Computational and Simulation Methods	MATH0080	Waves and Wave Scattering
		MATH0082	Evolutionary Games and Population Genetics
		MATH0088	Quantitative and Computational Finance
		MATH0102	Applied Stochastic Methods

Outside options or third year Mathematics options (at most 30 credits)

If you wish to choose an outside option, i.e. a module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are likely to be accepted. This information can often be found on the departmental website. Outside options are subject to approval by the Maths Dept Departmental Tutor and cannot be taken into account in the timetable. Only modules at level 6 or 7 can be chosen and 120 modules at level 7 have to be taken during your degree to graduate with the MSci.

BSc/MSci Mathematics with Economics

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	MATH0004	Analysis 2
MATH0005	Algebra 1	MATH0006	Algebra 2
MATH0010	Mathematical Methods 1	MATH0011	Mathematical Methods 2
MATH0002	Economics 1 (30 credits)	MATH0002	<i>Continued</i>

YEAR 2

Term 1

The modules below are compulsory and are at Level 5

MATH0013 Analysis 3: Complex Analysis
 MATH0014 Algebra 3: Further Linear Algebra
 MATH0016 Mathematical Methods 3

Term 1 and 2

The following module is compulsory at is at Level 5

STAT0001 Economics 2 (30 credits)

Term 2

All students (BSc/MSci)

Choose three modules (45 credits) from the optional modules below. Your choice of options in the second year has a large impact on what can be chosen in the third year (and fourth year for MSci students): you should look at the third/fourth year options (below) and the module pathways information to help you choose.

MSci students

MSci students are advised to take three mathematics options and also to look carefully at the year 3/4 structure to see the implications for your choice of modules in Year 2.

Year 2 options

MATH0034 Number Theory (Level 5)
 MATH0051 Analysis 4: Real Analysis (Level 6)
 MATH0052 Geometry and Groups (Level 5)
 MATH0053 Algebra 4: Groups and Rings (Level 6)
 MATH0055 Electromagnetism (Level 5)
 MATH0056 Mathematical Methods 4 (Level 6)
 MATH0057 Probability and Statistics (Level 5)
 MATH0058 Computational Methods (Level 5)
Outside option (15 credits)

If you wish to choose an outside option, i.e. a 15 credit module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are eligible to take the module from the point of view of the teaching department. All outside options need to be approved by the Mathematics Departmental Tutor. Although outside options are normally taken in term 2, it is possible to take an outside option in term 1 or through terms 1 and 2 if the timetable works.

YEAR 3

All students (BSc/MSci)

You choose 30 credits of suitable Economics modules (see list of Economics Modules below) and 90 credits (6 modules) from the list of Mathematics Modules below which include all standard year 3 Mathematics options, some year 4 Mathematics options, year 2 Mathematics options not previously taken, three standard Statistics options and the Maths Education module. [From the point of view of BSc students, which modules are in groups 1A, 1B and 2 is irrelevant, although if you wish to keep open the possibility of switching to the MSci, you should follow the MSci rules.] You may substitute up to 30 credits of these Mathematics options with outside option(s), subject to approval. 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. Please take advice and look at the module pathways.

MSci students

In addition to the rules above, you must choose one of the three groups 1A, 1B and 2 and choose at least three modules from that group. To give you some flexibility in year 4, you are strongly advised to include at least one module at level 7 this year: to graduate with the MSci you must take at least 120 credits, from all years, at level 7: please have a look at year 4 to see the restrictions created by the fact that there are no level 7 modules offered by the Economics department. 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

LIST OF MODULES

All modules are at level 6 unless otherwise specified. Level 7 modules are likely to be harder and have a 50% pass mark.

Term 1		Term 2	
Main Year 3 Mathematics options			
MATH0017	Measure Theory	MATH0018	Functional Analysis
MATH0019	Multivariable Analysis	MATH0020	Differential Geometry
MATH0022	Galois Theory	MATH0021	Commutative Algebra
MATH0023	Algebraic Topology	MATH0027	Mathematical Methods 5
MATH0025	Mathematics for General Relativity	MATH0028	Combinatorial Optimisation
MATH0026	Biomathematics	MATH0031	Financial Mathematics
MATH0029	Graph Theory and Combinatorics	MATH0035	Algebraic Number Theory
MATH0030	Mathematical Ecology	MATH0036	Elliptic Curves
MATH0032	Introduction to Mathematica	MATH0037	Logic
MATH0033	Numerical Methods	MATH0038	History of Mathematics
MATH0070	Linear Partial Differential Equations (L7)	MATH0054	Analytical Dynamics
MATH0074	Topology and Groups (L7)	MATH0069	Probability (L7)
MATH0075	Lie Groups and Lie Algebras (L7)	MATH0073	Representation Theory (L7)
MATH0083	Prime Numbers and their Distribution (L7)	MATH0080	Waves and Wave Scattering
		MATH0090	Elliptic PDEs (L7)
		MATH0092	Variational Methods for PDEs (L7)
		MATH0102	Applied Stochastic Methods (L7)
		MATH0104	Modular Forms (L7)
Stats modules and Maths Education [Note: Although these are counted as Mathematics options, you will need to register with Statistics/IOE and acceptance is not guaranteed]			
STAT0005	Probability and Statistics II	STAT0007	Stochastic Processes
CPAS0012	Mathematical Education for Physical and Mathematical Sciences	STAT0011	Decision and Risk
Mathematics options from Year 2			
		MATH0034	Number Theory (L5)
		MATH0051	Analysis 4: Real Analysis
		MATH0052	Geometry and Groups (L5)
		MATH0053	Algebra 4: Groups and Rings
		MATH0055	Mathematics of EM and Special Relativity (L5)
		MATH0056	Mathematical Methods 4

		MATH0057	Probability and Statistics (L5)
		MATH0058	Computational Methods (L5)

Year 3 Economics options (30 credits)

These are likely to include the following list, which are all at level 6 and 15 credits unless otherwise noted.

<i>Term 1</i>		<i>Term 2</i>	
ECON0025	Economics of Competition Policy	ECON0001	Economics of Financial Markets
ECON0027	Game Theory	ECON0023	International Trade
ECON0040	Behavioural Economics	ECON0028	The Economics of Growth
ECON0047	Economics of Labour	ECON0048	Economics of Finance (L5)
ECON0054	Economics of Development	ECON0052	Environmental Economics
ECON0055	Economics of Science	ECON0053	Economics of Tax Policy
ECON0110	Gender and Ethnicity in the Economy	ECON0056	Economics of Education
ECON0121	Economic History	ECON0123	Network Science For Economists
ECON0019	Quantitative Economics and Econometrics (Level 5 and 30 credits)	ECON0019 (continued)	

Outside options (maximum 30 credits)

You can choose up to 30 credits of outside options. If you wish to choose an outside option, i.e. a module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are likely to be accepted. This information can often be found on the departmental web-site. Outside options are subject to approval by the Maths Dept Departmental Tutor and cannot be taken into account in the timetable.

Groups of modules for MSci students

Group 1A Analysis/PDEs

MATH0017	Measure Theory	MATH0018	Functional Analysis
MATH0019	Multivariable Analysis	MATH0020	Differential Geometry
MATH0029	Graph Theory and Combinatorics	MATH0069	Probability (L7)
MATH0070	Linear Partial Differential Equations (L7)	MATH0092	Variational Methods for PDEs (L7)
MATH0083	Prime Numbers and their Distribution (L7)	MATH0090	Elliptic PDEs (L7)

Group 1B Algebra/Number Theory

MATH0022	Galois Theory	MATH0021	Commutative Algebra
MATH0023	Algebraic Topology	MATH0035	Algebraic Number Theory
MATH0029	Graph Theory and Combinatorics	MATH0036	Elliptic Curves
MATH0083	Prime Numbers and their Distribution (L7)	MATH0073	Representation Theory (L7)
		MATH0104	Modular Forms (L7)

Group 2 Applied/Applicable Mathematics/Methods

MATH0025	Mathematics for General Relativity	MATH0027	Mathematical Methods 5
MATH0026	Biomathematics	MATH0028	Combinatorial Optimisation
MATH0030	Mathematical Ecology	MATH0092	Variational Methods for PDEs (L7)
MATH0033	Numerical Methods	MATH0102	Applied Stochastic Methods (L7)

YEAR 4 (MSci)

The following module is compulsory and is worth 30 credits

MATH0084 (was MATHM901) Project (level 7)

As well as the project, you choose:

- (i) 30 credits from the Economics list, which includes all the level 6 Year 3 Economics Options (see list above) as well as

MATH0088 Quantitative and Computational Finance (L7) Term 2
MATH0085 Asset Pricing in Continuous Time (L7) Term 1

- (ii) 60 credits of Standard Year 4 Mathematics options.

It is possible to substitute up to 30 credits of these by suitable outside options or third year mathematics options but all modules taken must be at level 6 or 7.

Please note that you need to take 120 credits at level 7 from all years to graduate with the MSci. Thus if you have not taken any level 7 modules in your third year, you will not be able to take any level 6 options in year 4 and so will have to take MATH0085 and MATH0088 as your Economics options.

Standard Year 4 Mathematics options (level 7)

<i>Term 1</i>		<i>Term 2</i>	
MATH0070	Linear Partial Differential Equations	MATH0069	Probability
MATH0071	Spectral Theory	MATH0090	Elliptic PDEs
		MATH0092	Variational Methods for PDEs
MATH0072	Riemannian Geometry	MATH0073	Representation Theory
MATH0074	Topology and Groups	MATH0104	Modular Forms
MATH0075	Lie Groups and Lie Algebras		
MATH0076	Algebraic Geometry		
MATH0083	Prime Numbers and their Distribution		
MATH0065	Advanced Modelling Mathematical Techniques	MATH0078	Asymptotic Approximation Methods
MATH0086	Computational and Simulation Methods	MATH0079	Cosmology
		MATH0080	Waves and Wave Scattering
		MATH0082	Evolutionary Games and Population Genetics
		MATH0088	Quantitative and Computational Finance
		MATH0092	Variational Methods for PDEs
		MATH0102	Applied Stochastic Methods

Outside options or level 6 Mathematics modules (maximum 30 credits)

If you wish to choose an outside option, i.e. a module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are likely to be accepted. This information can often be found on the departmental website. Outside options are subject to approval by the Maths Dept Departmental Tutor and cannot be taken into account in the timetable. Only modules at level 6 or 7 can be chosen.

Please note that the choice of optional modules available may vary slightly from year to year and is subject to approval by the Maths Dept Departmental Tutor.

BSc/MSci Mathematics with Management Studies

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	MATH0004	Analysis 2
MATH0005	Algebra 1	MATH0006	Algebra 2
MATH0010	Mathematical Methods 1	MATH0011	Mathematical Methods 2
MSIN0048	Understanding Management	MSIN0003	Communication and Behaviour in Organisations

YEAR 2

Term 1

The modules below are compulsory and are at Level 5

MATH0013 Analysis 3: Complex Analysis
MATH0014 Algebra 3: Further Linear Algebra
MATH0016 Mathematical Methods 3
MSIN0004 Accounting for Business

Term 2

The following module is compulsory and at Level 5:

MSIN0049 Business in a Competitive Environment

All students (BSc/MSci)

Choose three modules (45 credits) from the optional modules below. Your choice of options in the second year has a large impact on what can be chosen in the third year (and fourth year for MSci students): you should look at the third/fourth year options (below) and the module pathways information to help you choose.

MSci students

MSci students are advised to take three mathematics options and also to look carefully at the year 3/4 structure to see the implications for your choice of modules in Year 2.

Year 2 options

MATH0034 Number Theory (Level 5)
MATH0051 Analysis 4: Real Analysis (Level 6)
MATH0052 Geometry and Groups (Level 5)
MATH0053 Algebra 4: Groups and Rings (Level 6)
MATH0055 Electromagnetism (Level 5)
MATH0056 Mathematical Methods 4 (Level 6)
MATH0057 Probability and Statistics (Level 5)
MATH0058 Computational Methods (Level 5)
Outside option (15 credits)

If you wish to choose an outside option, i.e. a 15 credit module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are eligible to take the module from the point of view of the teaching department. All outside options need to be approved by the Mathematics Departmental Tutor. Although outside options are normally taken in term 2, it is possible to take an outside option in term 1 or through terms 1 and 2 if the timetable works.

YEAR 3

All students (BSc/MSci)

The following module is compulsory (in Term 1 or in Term 2)

MSIN0147 Strategic Project Management (Level 6)

You also choose a suitable 15-credit Management module and 90 credits (normally 6 modules) from the list of Mathematics Modules below which include all standard year 3 Mathematics options, some year 4 Mathematics options, year 2 Mathematics options not previously taken, three standard Statistics options and the Maths Education module. [From the point of view of BSc students, which modules are in groups 1A, 1B and 2 is irrelevant, although if you wish to keep open the possibility of switching to the MSci, you should follow the MSci rules.] You may substitute up to 30 credits of these Mathematics options with outside option(s), subject to approval. 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.

MSci students

In addition to the rules above, you must choose one of the three groups 1A, 1B and 2 and choose at least three modules from that group. To give you some flexibility in year 4, it is a very good idea to include at least one module at level 7 this year: 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

LIST OF MODULES

All modules are at level 6 unless otherwise specified. Level 7 modules are likely to be harder and have a 50% pass mark.

<i>Term 1</i>		<i>Term 2</i>	
Main Year 3 Mathematics options			
MATH0017	Measure Theory	MATH0018	Functional Analysis
MATH0019	Multivariable Analysis	MATH0020	Differential Geometry
MATH0022	Galois Theory	MATH0021	Commutative Algebra
MATH0023	Algebraic Topology	MATH0027	Mathematical Methods 5
MATH0025	Mathematics for General Relativity	MATH0028	Combinatorial Optimisation
MATH0026	Biomathematics	MATH0031	Financial Mathematics
MATH0029	Graph Theory and Combinatorics	MATH0035	Algebraic Number Theory
MATH0030	Mathematical Ecology	MATH0036	Elliptic Curves
MATH0032	Introduction to Mathematica	MATH0037	Logic
MATH0033	Numerical Methods	MATH0038	History of Mathematics
MATH0070	Linear Partial Differential Equations (L7)	MATH0054	Analytical Dynamics
MATH0074	Topology and Groups (L7)	MATH0069	Probability (L7)
MATH0075	Lie Groups and Lie Algebras (L7)	MATH0073	Representation Theory (L7)
MATH0083	Prime Numbers and their Distribution (L7)	MATH0080	Waves and Wave Scattering (L7)
		MATH0092	Variational Methods for PDEs (L7)
		MATH0090	Elliptic PDEs (L7)
		MATH0102	Applied Stochastic Methods (L7)
		MATH0104	Modular Forms (L7)
Stats modules and Maths Education [Note: Although these are counted as Mathematics options, you will need to register with Statistics/IOE and acceptance is not guaranteed]			
STAT0005	Probability and Statistics II	STAT0007	Stochastic Processes
CPAS0012	Mathematical Education for Physical and Mathematical Sciences	STAT0011	Decision and Risk
Mathematics options from Year 2			
		MATH0034	Number Theory (L5)
		MATH0051	Analysis 4: Real Analysis
		MATH0052	Geometry and Groups (L5)
		MATH0053	Algebra 4: Groups and Rings
		MATH0055	Mathematics of EM and Special Relativity (L5)

		MATH0056	Mathematical Methods 4
		MATH0057	Probability and Statistics (L5)
		MATH0058	Computational Methods (L5)

Management options (15 credits)

You take 15 credits (1 module) of suitable Management options.

Outside options (maximum 30 credits)

You can choose up to 30 credits of outside options. If you wish to choose an outside option, i.e. a module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are likely to be accepted. This information can often be found on the departmental web-site. Outside options are subject to approval by the Maths Dept Departmental Tutor and cannot be taken into account in the timetable.

Groups of modules for MSci students

Group 1A Analysis/PDEs

MATH0017	Measure Theory	MATH0018	Functional Analysis
MATH0019	Multivariable Analysis	MATH0020	Differential Geometry
MATH0029	Graph Theory and Combinatorics	MATH0069	Probability (L7)
MATH0070	Linear Partial Differential Equations (L7)	MATH0092	Variational Methods for PDEs (L7)
MATH0083	Prime Numbers and their Distribution (L7)	MATH0090	Elliptic PDEs (L7)

Group 1B Algebra/Number Theory

MATH0022	Galois Theory	MATH0021	Commutative Algebra
MATH0023	Algebraic Topology	MATH0035	Algebraic Number Theory
MATH0029	Graph Theory and Combinatorics	MATH0036	Elliptic Curves
MATH0083	Prime Numbers and their Distribution (L7)	MATH0073	Representation Theory (L7)
		MATH0104	Modular Forms (L7)

Group 2 Applied/Applicable Mathematics/Methods

MATH0025	Mathematics for General Relativity	MATH0027	Mathematical Methods 5
MATH0026	Biomathematics	MATH0028	Combinatorial Optimisation
MATH0030	Mathematical Ecology	MATH0092	Variational Methods for PDEs (L7)
MATH0033	Numerical Methods	MATH0102	Applied Stochastic Methods (L7)

YEAR 4 (MSci)

The following module is compulsory and is worth 30 credits

MATH0084 Project (level 7)

You also choose 30 credits of level 7 Management modules and 60 credits from the list of year 4 Mathematics options. It is possible to substitute up to 30 credits of these by suitable outside options or third year mathematics options, but all modules taken must be at level 6 or 7, and you should be aware that you need to take 120 credits at level 7 (during your entire degree) to graduate with the MSci.

Standard Year 4 Mathematics options (level 7)

Term 1		Term 2	
MATH0070	Linear Partial Differential Equations	MATH0069	Probability
MATH0071	Spectral Theory	MATH0090	Elliptic PDEs
		MATH0092	Variational Methods for PDEs
MATH0072	Riemannian Groups	MATH0073	Representation Theory
MATH0074	Topology and Groups	MATH0104	Modular Forms
MATH0075	Lie Groups and Lie Algebras		
MATH0076	Algebraic Geometry		
MATH0083	Prime Numbers and their Distribution		
MATH0065	Advanced Modelling Mathematical Techniques	MATH0078	Asymptotic Approximation Methods
MATH0086	Computational and Simulation Methods	MATH0079	Cosmology
		MATH0080	Waves and Wave Scattering
		MATH0082	Evolutionary Games and Population Genetics
		MATH0088	Quantitative and Computational Finance
		MATH0092	Variational Methods for PDEs
		MATH0102	Applied Stochastic Methods

Management options (30 credits)

You choose 30 credits of suitable level 7 Management modules.

Outside options or third year Mathematics options (at most 30 credits)

If you wish to choose an outside option, i.e. a module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are likely to be accepted. This information can often be found on the departmental website. Outside options are subject to approval by the Maths Dept Departmental Tutor and cannot be taken into account in the timetable. Only modules at level 6 or 7 can be chosen.

BSc/MSci Mathematics with Mathematical Physics

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	MATH0004	Analysis 2
MATH0005	Algebra 1	MATH0006	Algebra 2
MATH0008	Applied Mathematics 1	MATH0009	Newtonian Mechanics
MATH0010	Mathematical Methods 1	MATH0011	Mathematical Methods 2

Year 2

Term 1

The modules below are compulsory and are at Level 5

MATH0013 Analysis 3: Complex Analysis

MATH0015 Fluid Mechanics

MATH0016 Mathematical Methods 3

You also choose

EITHER MATH0014 Algebra 3: Further Linear Algebra **OR** PHAS2222 Quantum Physics

Term 2

All students (BSc/MSci)

Choose four modules (60 credits) from the optional modules below. Your choice of options in the second year has a large impact on what can be chosen in the third year (and fourth year for MSci students): you should look at the third/fourth year options (below) and the module pathways information to help you choose.

MSci students

MSci students are advised to take four mathematics options, i.e. not to take an outside option (except possibly in Physics), and also to look carefully at the year 3/4 structure to see the implications for your choice of modules in Year 2.

Year 2 options (term 2)

MATH0034 Number Theory (Level 5)
MATH0051 Analysis 4: Real Analysis (Level 6)
MATH0052 Geometry and Groups (Level 5)
MATH0053 Algebra 4: Groups and Rings (Level 6)
MATH0055 Electromagnetism (Level 5)
MATH0056 Mathematical Methods 4 (Level 6)
MATH0057 Probability and Statistics (Level 5)
MATH0058 Computational Methods (Level 5)
Outside option (15 credits)

If you wish to choose an outside option, i.e. a 15 credit module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are eligible to take the module from the point of view of the teaching department. All outside options need to be approved by the Mathematics Departmental Tutor. Although outside options are normally taken in term 2, it is possible to take an outside option in term 1 or through terms 1 and 2 if the timetable works.

Year 3 (BSc/MSci)

All students (BSc/MSci)

You select 120 credits (normally 8 modules) from the list of modules below which include all standard year 3 Mathematics options, some year 4 Mathematics options, year 2 Mathematics options not previously taken, three standard Statistics options and the Maths Education module. [From the point of view of BSc students, which modules are in groups 1A, 1B and 2 is irrelevant, although if you wish to keep open the possibility of switching to the MSci, you should follow the MSci rules.]

You may substitute up to 45 credits of these with suitable Physics options and up to 30 credits of these with outside option(s), subject to approval. 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.

MSci students

In addition to the rules above, you must choose one of the three groups 1A, 1B and 2 and choose at least four modules from that group. To give you some flexibility in year 4, it is probably a good idea to include at least one module at level 7 this year: 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.

LIST OF MODULES

All modules are at level 6 unless otherwise specified. Level 7 modules are likely to be harder and have a 50% pass mark.

<i>Term 1</i>		<i>Term 2</i>	
Main Year 3 Mathematics options			
MATH0017	Measure Theory	MATH0018	Functional Analysis
MATH0019	Multivariable Analysis	MATH0020	Differential Geometry
MATH0022	Galois Theory	MATH0021	Commutative Algebra
MATH0023	Algebraic Topology	MATH0024	Geophysical Fluid Dynamics
MATH0025	Mathematics for General Relativity	MATH0027	Mathematical Methods 5
MATH0026	Biomathematics	MATH0028	Combinatorial Optimisation
MATH0029	Graph Theory and Combinatorics	MATH0031	Financial Mathematics
MATH0030	Mathematical Ecology	MATH0035	Algebraic Number Theory
MATH0032	Introduction to Mathematica	MATH0036	Elliptic Curves
MATH0033	Numerical Methods	MATH0037	Logic
MATH0070	Linear Partial Differential Equations (L7)	MATH0038	History of Mathematics
MATH0074	Topology and Groups (L7)	MATH0054	Analytical Dynamics
MATH0075	Lie Groups and Lie Algebras (L7)	MATH0069	Probability (L7)
MATH0077	Real Fluids (L7)	MATH0073	Representation Theory (L7)
MATH0083	Prime Numbers and their Distribution (L7)	MATH0080	Waves and Wave Scattering
		MATH0090	Elliptic PDEs (L7)
		MATH0092	Variational Methods for PDEs (L7)
		MATH0102	Applied Stochastic Methods (L7)
		MATH0104	Modular Forms (L7)
Stats modules and Maths Education [Note: Although these are counted as Mathematics options, you will need to register with Statistics/IOE and acceptance is not guaranteed]			
STAT0005	Probability and Statistics II	STAT0007	Stochastic Processes
CPAS0012	Mathematical Education for Physical and Mathematical Sciences	STAT0011	Decision and Risk
Mathematics options from Year 2			
MATH0014	Algebra 3 (L5)	MATH0034	Number Theory (L5)
		MATH0051	Analysis 4: Real Analysis
		MATH0052	Geometry and Groups (L5)
		MATH0053	Algebra 4: Groups and Rings
		MATH0055	Mathematics of EM and Special Relativity (L5)

		MATH0056	Mathematical Methods 4
		MATH0057	Probability and Statistics (L5)
		MATH0058	Computational Methods (L5)

Suitable Physics options (maximum 45 credits)

You can choose up to 45 credits of suitable level 5 or 6 Physics options, subject to approval by the Physics Department.

Outside options (maximum 30 credits)

You can choose up to 30 credits of outside options. If you wish to choose an outside option, i.e. a module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are likely to be accepted. This information can often be found on the departmental web-site. Outside options are subject to approval by the Maths Dept Departmental Tutor and cannot be taken into account in the timetable.

Groups of modules for MSci students

Group 1A Analysis/PDEs

MATH0017	Measure Theory	MATH0018	Functional Analysis
MATH0019	Multivariable Analysis	MATH0020	Differential Geometry
MATH0029	Graph Theory and Combinatorics	MATH0069	Probability (L7)
MATH0070	Linear Partial Differential Equations (L7)	MATH0092	Variational Methods for PDEs (L7)
MATH0083	Prime Numbers and their Distribution (L7)	MATH0090	Elliptic PDEs (L7)

Group 1B Algebra/Number Theory

MATH0022	Galois Theory	MATH0021	Commutative Algebra
MATH0023	Algebraic Topology	MATH0035	Algebraic Number Theory
MATH0029	Graph Theory and Combinatorics	MATH0036	Elliptic Curves
MATH0083	Prime Numbers and their Distribution (L7)	MATH0073	Representation Theory (L7)
		MATH0104	Modular Forms (L7)

Group 2 Applied/Applicable Mathematics/Methods

MATH0025	Mathematics for General Relativity	MATH0024	Geophysical Fluid Dynamics
MATH0026	Biomathematics	MATH0027	Mathematical Methods 5

MATH0030	Mathematical Ecology	MATH0028	Combinatorial Optimisation
MATH0033	Numerical Methods	MATH0092	Variational Methods for PDEs (L7)
MATH0077	Real Fluids (L7)	MATH0102	Applied Stochastic Methods (L7)

Year 4 (MSci)

The following module is compulsory and is worth 30 credits

MATH0084 Project (level 7)

As well as the 30-credit project, you should choose 90 credits from the list of Standard Year 4 Mathematics options below. It is possible to substitute up to 45 credits of these by suitable Physics options and up to 30 credits of these by suitable outside options or third year mathematics options, but all modules taken must be at level 6 or 7, and you should be aware that you need to take 120 credits at level 7 (during your entire degree) to graduate with the MSci.

Standard Year 4 Mathematics options (level 7)

Term 1		Term 2	
MATH0070	Linear Partial Differential Equations	MATH0069	Probability
MATH0071	Spectral Theory	MATH0090	Elliptic PDEs
MATH0083	Prime Numbers and their Distribution	MATH0092	Variational Methods for PDEs
MATH0072	Riemannian Geometry	MATH0073	Representation Theory
MATH0074	Topology and Groups	MATH0104	Modular Forms
MATH0075	Lie Groups and Lie Algebras		
MATH0076	Algebraic Geometry		
MATH0083	Prime Numbers and their Distribution		
MATH0065	Advanced Modelling Mathematical Techniques	MATH0078	Asymptotic Approximation Methods
MATH0077	Real Fluids	MATH0079	Cosmology
MATH0086	Computational and Simulation Methods	MATH0080	Waves and Wave Scattering
		MATH0082	Evolutionary Games and Population Genetics
		MATH0088	Quantitative and Computational Finance
		MATH0102	Applied Stochastic Methods

Physics options (at most 45 credits)

You can choose up to 45 credits of suitable level 6 or 7 Physics options, subject to approval by the Physics Department.

Outside options or third year Mathematics options (at most 30 credits)

If you wish to choose an outside option, i.e. a module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are likely to be accepted. This information can often be found on the departmental website. Outside options are subject to approval by the Maths Dept Departmental Tutor and cannot be taken into account in the timetable. Only modules at level 6 or 7 can be chosen and 120 modules at level 7 have to be taken during your degree to graduate with the MSci.

BSc/MSci Mathematics with Modern Languages

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

The following 6 modules are compulsory and at Level 4

Term 1		Term 2	
MATH0003	Analysis 1	MATH0004	Analysis 2
MATH0005	Algebra 1	MATH0006	Algebra 2
MATH0010	Mathematical Methods 1	MATH0011	Mathematical Methods 2

You also take 30 credits of Language Centre modules at a suitable level. You can either take a single 30-credit language module or two 15-credit modules. All Language Centre modules last through term 1 and term 2.

YEAR 2

Term 1

The modules below are compulsory and are at Level 5

MATH0013 Analysis 3: Complex Analysis
MATH0014 Algebra 3: Further Linear Algebra
MATH0016 Mathematical Methods 3

Term 1 and 2

Take 30 credits of Language Centre modules at a suitable level. You can either take a single 30-credit language module or two 15-credit modules. All Language Centre modules last through term 1 and term 2.

Term 2

All students (BSc/MSci)

Choose three modules (45 credits) from the optional modules below. Your choice of options in the second year has a large impact on what can be chosen in the third year (and fourth year for MSci students): you should look at the third/fourth year options (below) and the module pathways information to help you choose.

MSci students

MSci students are advised to take three mathematics options and also to look carefully at the year 3/4 structure to see the implications for your choice of modules in Year 2.

Year 2 options

MATH0034 Number Theory (Level 5)
MATH0051 Analysis 4: Real Analysis (Level 6)
MATH0052 Geometry and Groups (Level 5)
MATH0053 Algebra 4: Groups and Rings (Level 6)
MATH0055 Electromagnetism (Level 5)
MATH0056 Mathematical Methods 4 (Level 6)
MATH0057 Probability and Statistics (Level 5)
MATH0058 Computational Methods (Level 5)
Outside option (15 credits)

If you wish to choose an outside option, i.e. a 15 credit module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are eligible to take the module from the point of view of the teaching department. All outside options need to be approved by the Mathematics Departmental Tutor. Although outside options are normally taken in term 2, it is possible to take an outside option in term 1 or through terms 1 and 2 if the timetable works.

YEAR 3

All students (BSc/MSci)

You choose 30 credits of suitable Language Centre modules and 90 credits (6 modules) from the list of Mathematics Modules below which include all standard year 3 Mathematics options, some year 4 Mathematics options, year 2 Mathematics options not previously taken, three standard Statistics options and the Maths Education module. [From the point of view of BSc students, which modules are in groups 1A, 1B and 2 is irrelevant, although if you wish to keep open the possibility of switching to the MSci, you should follow the MSci rules.] You may substitute up to 30 credits of these Mathematics options with outside option(s), subject to approval. 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. Please take advice and look at the module pathways.

MSci students

In addition to the rules above, you must choose one of the three groups 1A, 1B and 2 and choose at least three modules from that group. To give you some flexibility in year 4, you are strongly advised to include at least one module at level 7 this year: to graduate with the MSci you must take at least 120 credits, from all years, 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

List of Mathematics Modules

All modules are at level 6 unless otherwise specified. Level 7 modules are likely to be harder and have a 50% pass mark.

<i>Term 1</i>		<i>Term 2</i>	
Main Year 3 Mathematics options			
MATH0017	Measure Theory	MATH0018	Functional Analysis
MATH0019	Multivariable Analysis	MATH0020	Differential Geometry
MATH0022	Galois Theory	MATH0021	Commutative Algebra
MATH0023	Algebraic Topology	MATH0027	Mathematical Methods 5
MATH0025	Mathematics for General Relativity	MATH0028	Combinatorial Optimisation
MATH0026	Biomathematics	MATH0031	Financial Mathematics
MATH0029	Graph Theory and Combinatorics	MATH0035	Algebraic Number Theory
MATH0030	Mathematical Ecology	MATH0036	Elliptic Curves
MATH0032	Introduction to Mathematica	MATH0037	Logic
MATH0033	Numerical Methods	MATH0038	History of Mathematics
MATH0070	Linear Partial Differential Equations (L7)	MATH0054	Analytical Dynamics
MATH0074	Topology and Groups (L7)	MATH0069	Probability (L7)
MATH0075	Lie Groups and Lie Algebras (L7)	MATH0073	Representation Theory (L7)
MATH0083	Prime Numbers and their Distribution (L7)	MATH0090	Elliptic PDEs (L7)
		MATH0092	Variational Methods for PDEs (L7)
		MATH0102	Applied Stochastic Methods (L7)
		MATH0104	Modular Forms (L7)
Stats modules and Maths Education [Note: Although these are counted as Mathematics options, you will need to register with Statistics/IOE and acceptance is not guaranteed]			
STAT0005	Probability and Statistics II	STAT0007	Stochastic Processes
CPAS0012	Mathematical Education for Physical and Mathematical Sciences	STAT0011	Decision and Risk
Mathematics options from Year 2			
		MATH0034	Number Theory (L5)
		MATH0051	Analysis 4: Real Analysis
		MATH0052	Geometry and Groups (L5)
		MATH0053	Algebra 4: Groups and Rings
		MATH0055	Mathematics of EM and Special Relativity (L5)

		MATH0056	Mathematical Methods 4
		MATH0057	Probability and Statistics (L5)
		MATH0058	Computational Methods (L5)

Language Centre modules (30 credits)

You take 30 credits of Language Centre modules at a suitable level. You can either take a single 30-credit language module or two 15-credit modules. All Language Centre modules last through term 1 and term 2.

Outside options (maximum 30 credits)

You can choose up to 30 credits of outside options. If you wish to choose an outside option, i.e. a module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are likely to be accepted. This information can often be found on the departmental web-site. Outside options are subject to approval by the Maths Dept Departmental Tutor and cannot be taken into account in the timetable.

Groups of modules for MSci students

Group 1A Analysis/PDEs

MATH0017	Measure Theory	MATH0018	Functional Analysis
MATH0019	Multivariable Analysis	MATH0020	Differential Geometry
MATH0029	Graph Theory and Combinatorics	MATH0069	Probability (L7)
MATH0070	Linear Partial Differential Equations (L7)	MATH0092	Variational Methods for PDEs (L7)
MATH0083	Prime Numbers and their Distribution (L7)	MATH0090	Elliptic PDEs (L7)

Group 1B Algebra/Number Theory

MATH0022	Galois Theory	MATH0021	Commutative Algebra
MATH0023	Algebraic Topology	MATH0035	Algebraic Number Theory
MATH0029	Graph Theory and Combinatorics	MATH0036	Elliptic Curves
MATH0083	Prime Numbers and their Distribution (L7)	MATH0073	Representation Theory (L7)
		MATH0104	Modular Forms (L7)

Group 2 Applied/Applicable Mathematics/Methods

MATH0025	Mathematics for General Relativity	MATH0027	Mathematical Methods 5
MATH0026	Biomathematics	MATH0092	Variational Methods for PDEs (L7)
MATH0030	Mathematical Ecology	MATH0102	Applied Stochastic Methods (L7)
MATH0033	Numerical Methods		

YEAR 4 (MSci)

The following module is compulsory and is worth 30 credits

MATH0084 Project (level 7)

As well as the project, you choose:

- (i) 30 credits of suitable Language Centre modules
- (ii) 60 credits of Standard Year 4 Mathematics options.

It is possible to substitute up to 30 credits of these by suitable outside options or third year mathematics options but all modules taken must be at level 6 or 7, and you should be aware that you need to take 120 credits at level 7 (during your entire degree) to graduate with the MSci.

Standard Year 4 Mathematics options (level 7)

Term 1		Term 2	
MATH0070	Linear Partial Differential Equations	MATH0069	Probability
MATH0071	Spectral Theory	MATH0090	Elliptic PDEs
		MATH0092	Variational Methods for PDEs
MATH0072	Riemannian Geometry	MATH0073	Representation Theory
MATH0074	Topology and Groups	MATH0104	Modular Forms
MATH0075	Lie Groups and Lie Algebras		
MATH0076	Algebraic Geometry		
MATH0083	Prime Numbers and their Distribution		
MATH0065	Advanced Modelling Mathematical Techniques	MATH0078	Asymptotic Approximation Methods
MATH0086	Computational and Simulation Methods	MATH0079	Cosmology
		MATH0080	Waves and Wave Scattering
		MATH0082	Evolutionary Games and Population Genetics
		MATH0088	Quantitative and Computational Finance

		MATH0092	Variational Methods for PDEs
		MATH0102	Applied Stochastic Methods

Language Centre modules (30 credits)

You take 30 credits of Language Centre modules, which should be at level 7. You can either take a single 30-credit language module or two 15-credit modules. All Language Centre modules last through term 1 and term 2.

Outside options or level 6 Mathematics modules (maximum 30 credits)

If you wish to choose an outside option, i.e. a module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are likely to be accepted. This information can often be found on the departmental website. Outside options are subject to approval by the Mathematics Departmental Tutor and cannot be taken into account in the timetable. Only modules at level 6 or 7 can be chosen.

BSc/MSci Mathematics and Physics

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)

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

Choose 30 credits (two modules) from Mathematics year 3 options

Choose 45 credits from the options below

(i) Mathematics year 3 options:

(iii) Suitable and available Physics modules PHAS****

(iii) All UG Modules (at varying levels) – outside option (maximum 15 credits)

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.

<i>Term 1</i>		<i>Term 2</i>	
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
MATH0070	Linear Partial Differential Equations (L7)	MATH0038	History of Mathematics
MATH0075	Lie Groups and Lie Algebras (L7)	MATH0080	Waves and Wave Scattering
MATH0077	Real Fluids (L7)	MATH0090	Elliptic PDEs (L7)
CPAS0012	Mathematical Education for Physical and Mathematical Sciences	MATH0092	Variational Methods for PDEs (L7)
		MATH0102	Applied Stochastic Methods (L7)
Mathematics options from Year 2			
		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)

Outside options

You can choose up to 15 credits of outside options. If you wish to choose an outside option, i.e. a module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are likely to be accepted. This

information can often be found on the departmental web-site. Outside options are subject to approval by the Maths Dept Departmental Tutor and cannot be taken into account in the timetable.

Please note that the choice of optional modules available may vary slightly from year to year and is subject to change.

Year 4 (MSci)

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

Then you also choose 75 credits (5 modules) from the following list of options:

(i) Standard Year 4 Mathematics options

(ii) Suitable Level 6 or 7 Physics options

(iii) Suitable and available UCL modules at level 6 or 7 (subject to departmental approval)

This must include at least 30 credits of (i) and 30 credits of (ii). 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.

Standard Year 4 Mathematics options (level 7)

<i>Term 1</i>		<i>Term 2</i>	
MATH0070	Linear Partial Differential Equations	MATH0069	Probability
MATH0071	Spectral Theory	MATH0090	Elliptic PDEs
MATH0083	Prime Numbers and their Distribution	MATH0092	Variational Methods for PDEs
MATH0075	Lie Groups and Lie Algebras		
MATH0083	Prime Numbers and their Distribution		
MATH0065	Advanced Modelling Mathematical Techniques	MATH0078	Asymptotic Approximation Methods
MATH0077	Real Fluids	MATH0079	Cosmology
MATH0086	Computational and Simulation Methods	MATH0080	Waves and Wave Scattering
		MATH0082	Evolutionary Games and Population Genetics
		MATH0088	Quantitative and Computational Finance
		MATH0102	Applied Stochastic Methods

Outside options

If you wish to choose an outside option, i.e. a module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are likely to be accepted. This information can often be found on the departmental website. Outside options are subject to approval by the Maths Dept Departmental Tutor and cannot be taken into account in the timetable. Only modules at level 6 or 7 can be chosen.

Please note that the choice of optional modules available may vary slightly from year to year and is subject to approval by the Maths Dept Departmental Tutor.

BSc/MSci Mathematics and Statistical Science

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	MATH0004	Analysis 2
MATH0005	Algebra 1	MATH0011	Mathematical Methods 2
MATH0010	Mathematical Methods 1	STAT0003	Further Probability and Statistics
STAT0002	Introduction to Probability and Statistics		
STAT0004	Introduction to Practical Statistics	STAT0004	<i>continued</i>

YEAR 2

The modules below are compulsory except for the choice between STAT0025 and STAT0024. All are at level 5 unless noted otherwise.

Term 1		Term 2	
MATH0013	Analysis 3: Complex Analysis	MATH0006	Algebra 2
STAT0005	Probability and Inference	MATH0051	Analysis 4: Real Analysis (L6)
STAT0006	Linear Models and the Analysis of Variance	STAT0007	Introduction to Applied Probability
		STAT0023	Linear Models and the Analysis
STAT0025	Optimisation Algorithms in Operational Research (L6)	OR STAT0024	Social Statistics

Year 3 (BSc)

The module below is compulsory

STAT0008 Statistical Inference (Level 6 Term 1)

Choose 105 credits of options from the following groups:

(i) At least 15 credits and at most 75 credits from **Year 3 Statistics Options for Mathematics and Statistics**

(ii) At least 30 credits and at most 90 credits from **Year 3 Mathematics Options for Mathematics and Statistics and**

(iii) At most 15 credits: **CPAS0012 Mathematical Education for Physical and Mathematical Sciences** (i.e. you can choose this module if you wish)

(iv) On an ad hoc basis, any suitable and available UCL modules of 15 credits, on request by the student and subject to Departmental approval.

(i) Year 3 Statistics Options for Mathematics and Statistics

Any suitable and available level 6 Statistics modules or STAT0024 Social Statistics (level 5 term 2), subject to approval by the Statistics Department.

(ii) Year 3 Mathematics options for Mathematics and Statistics

These are all at level 6 unless otherwise noted, and all worth 15 credits each.

<i>Term 1</i>		<i>Term 2</i>	
MATH0014	Further Linear Algebra (L5)	MATH0018	Functional Analysis
MATH0016	Mathematical Methods 3 (L5)	MATH0020	Differential Geometry
MATH0017	Measure Theory	MATH0028	Combinatorial Optimisation
MATH0019	Multivariable Analysis	MATH0031	Financial Mathematics
MATH0026	Biomathematics	MATH0034	Number T
MATH0029	Graph Theory and Combinatorics	MATH0037	Logic
MATH0030	Mathematical Ecology	MATH0038	History of Mathematics
MATH0032	Introduction to Mathematica	MATH0052	Geometry and Groups (L5)
MATH0033	Numerical Methods	MATH0053	Algebra 4: Groups and Rings
MATH0070	Linear Partial Differential Equations (L7)	MATH0056	Mathematical Methods 4
MATH0083	Prime Numbers and their Distribution (L7)	MATH0058	Computational Methods (L5)
		MATH0069	Probability (L7)
		MATH0090	Elliptic PDEs (L7)
		MATH0092	Variational Methods for PDEs (L7)

(iv) Outside options

You can choose up to 15 credits of outside options. If you wish to choose an outside option, i.e. a module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are likely to be accepted. This

information can often be found on the departmental web-site. Outside options are subject to approval by the Maths Dept Departmental Tutor and cannot be taken into account in the timetable.

Please note that various level 5 options are included in your options, but you must take at least 90 credits at level 6 or 7 during your degree to graduate with the BSc. The modules MATH0051 (compulsory year 2) and STAT0025 (optional year 2) are at level 6.

Year 3 (MSci)s

The module below is compulsory

STAT0008 Statistical Inference (Level 6 Term 1)

Choose **EITHER**

(a) MATH0014 Algebra 3 (Term 1) and MATH0053 Algebra 4 (Term 2)

OR

(b) MATH0016 Methods 3 (Term 1) and MATH0056 Methods 4 (Term 2)

OR

(c) 30 credits from the following list of modules

MATH0017 Measure Theory (Term 1)

MATH0018 Functional Analysis (Term 2)

MATH0019 Multivariable Analysis (Term 1)

MATH0020 Differential Geometry (Term 2)

MATH0029 Graph Theory and Combinatorics (Term 1)

MATH0069 Probability (Term 2)

MATH0070 Linear Partial Differential Equations (L7) (Term 1)

MATH0083 Prime Numbers and their Distribution (L7) (Term 1)

MATH0090 Elliptic PDEs (L7) (Term 2)

MATH0092 Variational Methods for PDEs (L7) (Term 2)

Choose 75 credits of options from the following groups:

(i) At least 15 credits and at most 75 credits from **Year 3 Statistics Options for Mathematics and Statistics**

(ii) At most 60 credits from **Year 3 Mathematics Options for Mathematics and Statistics**

(iii) On an ad hoc basis, any suitable and available UCL modules of 15 credits, on request by the student and subject to Departmental approval.

(i) Year 3 Statistics Options for Mathematics and Statistics

Any suitable and available level 6 Statistics modules or STAT0024 Social Statistics (level 5), subject to approval by the Statistics Department.

(ii) Year 3 Mathematics options for Mathematics and Statistics

These are all at level 6 unless otherwise noted, and all worth 15 credits each.

<i>Term 1</i>		<i>Term 2</i>	
MATH0014	Further Linear Algebra (L5)	MATH0018	Functional Analysis
MATH0016	Mathematical Methods 3 (L5)	MATH0020	Differential Geometry
MATH0017	Measure Theory	MATH0028	Combinatorial Optimisation
MATH0019	Multivariable Analysis	MATH0031	Financial Mathematics
MATH0026	Biomathematics	MATH0034	Number T
MATH0029	Graph Theory and Combinatorics	MATH0037	Logic
MATH0030	Mathematical Ecology	MATH0038	History of Mathematics
MATH0032	Introduction to Mathematica	MATH0052	Geometry and Groups (L5)
MATH0033	Numerical Methods	MATH0053	Algebra 4: Groups and Rings
MATH0070	Linear Partial Differential Equations (L7)	MATH0056	Mathematical Methods 4
MATH0083	Prime Numbers and their Distribution (L7)	MATH0058	Computational Methods (L5)
CPAS0012	Mathematical Education for Physical and Mathematical Sciences	MATH0069	Probability (L7)
		MATH0090	Elliptic PDEs (L7)
		MATH0092	Variational Methods for PDEs (L7)

(iii) Outside options (maximum 15 credits)

You can choose up to 15 credits of outside options. If you wish to choose an outside option, i.e. a module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are likely to be accepted. This information can often be found on the departmental web-site. Outside options are subject to approval by the Maths Dept Departmental Tutor and cannot be taken into account in the timetable.

Please note that various level 5 options are included in your options, but you must take at least 90 credits at level 6 or 7 during your degree to graduate with the BSc. The modules MATH0051 (compulsory year 2) and STAT0025 (optional year 2) are at level 6. You also need to take at least 120 credits at level 7 during your degree to graduate with the MSci, and you should make sure that your choices lead on to suitable modules and projects in Year 4.

YEAR 4 (MSci)

Choose one of the following two modules, each at Level 7 and worth 30 credits

MATH0084 (was MATHM901) Project

STAT0035 (was STATM901) Project

Choose 90 credits from

(i) At least 30 credits and at most 60 credits from Standard Year 4 Statistics options for Mathematics and Statistics

(ii) At least 30 credits and at most 60 credits from Standard Year 4 Mathematics options for Mathematics and Statistics (see below for current list)

(iii) On an adhoc basis, any suitable and available UCL modules of 15 credits, on request by the student and subject to Departmental approval.

(i) Standard Year 4 Statistics options

Any suitable Statistics option at level 7

(ii) Standard Year 4 Mathematics options for Mathematics and Statistics

These are all at level 7 and worth 15 credits

Term 1		Term 2	
MATH0065	Advanced Modelling Mathematical Techniques	MATH0069	Probability
MATH0070	Linear Partial Differential Equations	MATH0090	Elliptic PDEs
MATH0071	Spectral Theory	MATH0092	Variational Methods for PDEs
MATH0083	Prime Numbers and their Distribution	MATH0080	Waves and Wave Scattering
MATH0086	Computational and Simulation Methods	MATH0082	Evolutionary Games and Population Genetics
		MATH0088	Quantitative and Computational Finance
		MATH0102	Applied Stochastic Methods

(iii) All UG Modules – outside options (maximum 15 credits)

If you wish to choose an outside option, i.e. a module from another department, you should first check information with the relevant department, including pre-requisites, registration procedures and whether you are likely to be accepted. This could also include level 6 mathematics options. This information can often be found on the departmental website. Outside options are subject to approval by the Maths Dept Departmental Tutor and cannot be taken into account in the timetable. Only modules at level 6 or 7 can be chosen.