

Mathematics Undergraduate Programmes

F111	BSc (Hons) in Mathematics
F141	BSc (Hons) in Mathematics with Physics
F181	BSc (Hons) in Mathematics with Computer Science
F191	BSc (Hons) in Mathematics with a European Language
F1A1	BSc (Hons) in Mathematics with Statistics
F1B1	BSc (Hons) in Mathematics with Finance
F1F1	BSc (Hons) in Mathematical, Statistical and Actuarial Sciences
F1G1	BSc (Hons) in Mathematics and Computer Science
F1H1	Master of Mathematics
F1J1	BSc (Hons) in Mathematical Statistical and Actuarial Sciences with Diploma in Industrial Training
F1K1	BSc (Hons) in Mathematics with Finance with Diploma in Industrial Training
F111	BSc (Hons) in Mathematical Studies

The online enrolment system will allow you to select the courses you wish to study during Academic Year 2018/19: in most cases you should register for eight courses. Your courses are categorised into Mandatory and Optional courses:

<u>Mandatory Courses</u>	<u>Optional Courses</u>	<u>Elective Courses</u> (shown under <u>Optional Courses</u> during online enrolment)
All mandatory courses for your programme are listed on the online enrolment system. These courses cannot be altered and must be taken to meet the requirements for your programme of study. If your programme consists entirely of mandatory courses then no further action is required regarding selection of courses.	All optional courses for your programme are listed within the online enrolment system, if applicable. If no optional courses are listed, please ignore and move to the next screen within the online enrolment system. For further information on the selection of your courses, please refer to your specific programme information below.	You will need to use the course search facility within the online enrolment system to find elective courses. These may be listed under the specific programme information found in this document. If no information is present, please ignore.

Further Information

To assist you in the selection of your optional/elective courses, please find below additional information relating to the programme you are currently enrolling for. Make sure that you check the information for the correct year of study: this will be the study year you are entering in 2018/19.

Please note that mandatory courses will not clash on your timetable. Whilst the University aims to accommodate a full range of optional/elective courses, it may not be possible for the timetable to provide all choice combinations.

Timetables will be available 2 weeks prior to the start of Semester and you are advised to check your timetable at this time. In the unlikely event that you have selected courses which result in a timetable clash, you should seek advice from your tutor as to the availability of alternative courses. Timetables can be found at: <http://www.macs.hw.ac.uk/students/math/>

Some optional/elective courses may be subject to change before the start of Semester. We try to offer everyone the optional/elective courses that they request. However, certain courses can accept only a limited number of students, and in the event that you have selected a course which is over-subscribed, you will be contacted and you should then consult your tutor for advice.

Changed your mind?

If you decide to change courses following online enrolment, you will have to complete a *Change of Course* form found at: <http://www.hw.ac.uk/registry/resources/changeofcourseform.pdf>. Changes requested in this way will need to be approved by the Mathematics Department.

University Regulations and Programme Structures

Great care has been taken in compiling this Enrolment Guide, but if at any point it conflicts with University Regulations or officially designated Programme Structures, then this Guide is wrong.

PROGRAMMES FOR FIRST YEAR STUDENTS

- The First Year Director of Studies is Professor Mark V Lawson (email: M.V.Lawson@hw.ac.uk)
- At this stage, it is important that you enrol for *some* programme. If you think you might want to change --- don't worry --- you can discuss this with Professor Lawson during Welcome Week. Nothing is set in stone at this stage.
- For each of the degree programmes below, we have marked in **bold** those courses which you need to enter manually. If your courses have a choice of campus, make sure that you select *Edinburgh*.
- If no courses are marked in bold, then all your courses are mandatory.
- All programmes are four years except where indicated.
- Many programmes are identical in the first year making programme changes in the second year easier.
- Programmes with WITH in the title are 75% Mathematics (over four years).
- The programme with AND in the title is 50% Mathematics (over four years).

F111 BSc (Hons) in Mathematics F17GC and F17SC may be replaced with an elective. Please enrol in these courses anyway and discuss these elective with Prof Lawson during Welcome Week when changes can be made			
Year/ Stage	Course Code	Semester	Course Title
1	F17CA	1	Calculus A
1	F17CC	1	Introduction to University Maths
1	F77SA	1	Introduction to Statistical Science A
1	F17GC	1	Mathematics in Context
1	F17CB	2	Calculus B
1	F17GA	2	Problem Solving
1	F77SB	2	Introduction to Statistical Science B
2	F17SC	2	Discrete Mathematics

F141 BSc (Hons) in Mathematics with Physics			
Year/ Stage	Course Code	Semester	Course Title
1	B27MW	1	Mechanics and Waves
1	F17CA	1	Calculus A
1	F17CC	1	Introduction to University Maths
1	F77SA	1	Introduction to Statistical Science A
1	B27FF	2	Waves and Matter
1	F17CB	2	Calculus B
1	F17GA	2	Problem Solving
1	F77SB	2	Introduction to Statistical Science B

F181 BSc (Hons) in Mathematics with Computer Science (75% and 25% over four years)			
Year/ Stage	Course Code	Semester	Course Title
1	F17CA	1	Calculus A
1	F17CC	1	Introduction to University Maths
1	F27SA	1	Software Development 1
1	F77SA	1	Introduction to Statistical Science A
1	F17CB	2	Calculus B
1	F77SB	2	Introduction to Statistical Science B
1	F27SB	2	Software Development 2
1	F27SG	2	Software Development 3

F191 BSc (Hons) in Mathematics with a European Language FRENCH			
Year/ Stage	Course Code	Semester	Course Title
1	F17CA	1	Calculus A
1	F17CC	1	Introduction to University Maths
1	F77SA	1	Introduction to Statistical Science A
1	C47LF	1	French Intermediate 1
1	F17CB	2	Calculus B
1	F17GA	2	Problem Solving
1	F77SB	2	Introduction to Statistical Science B
1	C47MF	2	French Intermediate 2

F191 BSc (Hons) in Mathematics with a European Language GERMAN			
Year/ Stage	Course Code	Semester	Course Title
1	F17CA	1	Calculus A
1	F17CC	1	Introduction to University Maths
1	F77SA	1	Introduction to Statistical Science A
1	C47LG	1	German Intermediate 1
1	F17CB	2	Calculus B
1	F17GA	2	Problem Solving
1	F77SB	2	Introduction to Statistical Science B
1	C47MG	2	German Intermediate 2

F191 BSc (Hons) in Mathematics with a European Language SPANISH			
Year/ Stage	Course Code	Semester	Course Title
1	F17CA	1	Calculus A
1	F17CC	1	Introduction to University Maths
1	F77SA	1	Introduction to Statistical Science A
1	C47LE	1	Spanish Intermediate 1
1	F17CB	2	Calculus B
1	F17GA	2	Problem Solving
1	F77SB	2	Introduction to Statistical Science B
1	C47ME	2	Spanish Intermediate 2

F1A1 BSc (Hons) in Mathematics with Statistics F17GC and F17SC may be replaced with an elective Please enrol in these courses anyway and discuss these elective with Prof Lawson during Welcome Week when changes can be made			
Year/ Stage	Course Code	Semester	Course Title
1	F17CA	1	Calculus A
1	F17CC	1	Introduction to University Maths
1	F77SA	1	Introduction to Statistical Science A
1	F17GC	1	Mathematics in Context
1	F17CB	2	Calculus B
1	F17GA	2	Problem Solving
1	F77SB	2	Introduction to Statistical Science B
2	F17SC	2	Discrete Mathematics

F1B1 (F1K1) BSc (Hons) in Mathematics with Finance (+Dip)			
Year/ Stage	Course Code	Semester	Course Title
1	F17CA	1	Calculus A
1	F17CC	1	Introduction to University Maths
1	F77SA	1	Introduction to Statistical Science A
1	C27IE	1	Introductory Economics
1	F17CB	2	Calculus B
1	F17GA	2	Problem Solving
1	F77SB	2	Introduction to Statistical Science B
1	C37FF	2	Finance and Financial reporting

F1F1 (F1J1) BSc in Mathematical, Statistical and Actuarial Sciences (+Dip) (known as MSAS)			
Please enter the courses in bold. You will then be following the same courses as Actuarial students including professional exemptions			
Year/ Stage	Course Code	Semester	Course Title
1	F17CA	1	Calculus A
1	F17CC	1	Introduction to University Maths
1	F77SA	1	Introduction to Statistical Science A
1	C27IE	1	Introductory Economics
1	F17CB	2	Calculus B
1	F77SB	2	Introduction to Statistical Science B
1	F77PD	2	Professional Development Planning
1	C37FF	2	Finance and Financial Reporting

F1G1 BSc in Mathematics and Computer Science (50% and 50% over four years)			
Year/ Stage	Course Code	Semester	Course Title
1	F17CA	1	Calculus A
1	F17CC	1	Introduction to University Maths
1	F27SA	1	Software Development 1
1	F27IS	1	Interactive Systems
1	F17CB	2	Calculus B
1	F27SB	2	Software Development 2
1	F27SG	2	Software Development 3
1	F27CS	2	Introduction to Computer Systems

F1H1 Master of Mathematics (5 years)			
<i>This currently differs from the BSc degree in the first year in requiring higher grades to pass.</i>			
F17GC1 and F17SC may be replaced with an elective			
Please enrol in these courses anyway and discuss these elective with Prof Lawson during Welcome Week when changes can be made			
Year/ Stage	Course Code	Semester	Course Title
1	F17CA	1	Calculus A
1	F17CC	1	Introduction to University Maths
1	F77SA	1	Introduction to Statistical Science A
1	F17GC	1	Mathematics in Context
1	F17CB	2	Calculus B
1	F17GA	2	Problem Solving
1	F77SB	2	Introduction to Statistical Science B
2	F17SC	2	Discrete Mathematics

PROGRAMMES FOR SECOND, THIRD, FOURTH AND FIFTH YEAR HONOURS STUDENTS

F111 BSc (Hons) in Mathematics

Further Assistance

If you require further help in choosing your courses, please contact the Programme Director Professor Andy White (A.R.White@hw.ac.uk)

Year/Stage 2

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
2	F18AA	1	Applied Mathematics A
2	F18CD	1	Multivariable Calculus and Real Analysis A
2	F18CF	1	Linear Algebra
2	F18CE	2	Multivariable Calculus and Real Analysis B
2	F18NA	2	Numerical Analysis A
2	F18PA	2	Pure Mathematics A

Optional/Elective Courses

You should choose one optional course each semester. F17SC can only be chosen if you did not take this course in Year 1. F18GD Mathematics for Direct Entrants may be chosen only by students entering directly into 2nd year. Before you can choose C38FR, C38FM, C38MO, C38FN or C38SE you have to have a grade D or above in C37FF. Before you can choose B28PO or B28TP you have to have a grade D or above in B27MW and B27FF. Due to timetabling reasons it is unlikely that it will be possible to choose C28EP or C38SE during the academic year 2018/19

Optional Courses

Year/Stage	Course Code	Semester	Course Title
2	B28PO	1	Photonics and Optics
2	C38FM	1	Financial Markets Theory
2	C38FR	1	Financial Reporting
2	F17LP	1	Logic and Proof
2	F18GD	1	Mathematics for Direct Entrants
2	F27IS	1	Interactive Systems
2	F78PA	1	Probability and Statistics A
2	B28TP	2	Thermal Physics and Properties of Matter
2	C28EP	2	Contemporary Economic Policy and Institutions
2	C38FN	2	Corporate Financial Theory
2	C38MO	2	Management Accounting in Organisations
2	C38SE	2	Social and Environmental Accounting
2	F17SC	2	Discrete Mathematics
2	F18GW	2	Mathematics Workshop
2	F27WD	2	Web Design and Databases
2	F78PB	2	Probability and Statistics B
2	F78SC	2	Statistics for Science

Year/Stage 3

Mandatory Courses

There are no mandatory courses in this year of the programme.

Optional/Elective Courses

If you are studying at the Edinburgh campus you **must choose** F19GB, F19MV, F19PB, F19PL, F19AB, F19MC, F19MO and F19NB.

If you are studying abroad at Waterloo in Year 3, you must choose the courses F19WA and F19WB (and so enrol for only these two courses in total.)

Optional Courses

Year/Stage	Course Code	Semester	Course Title
3	F19GB	1	Project Preparation
3	F19MV	1	Vector Analysis
3	F19PB	1	Pure Mathematics B
3	F19PL	1	Abstract Algebra
3	F19WA	1	Year Abroad Waterloo A
3	F19AB	2	Applied Mathematics B
3	F19MC	2	Complex Analysis
3	F19MO	2	Ordinary Differential Equations
3	F19NB	2	Numerical Analysis B
3	F19WB	2	Year Abroad Waterloo B

Year/Stage 4

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
4	F10GP	2	Mathematics Project Dissertation

Optional Courses

You should choose four courses in the first semester and three courses in the second semester from those listed.

Year/Stage	Course Code	Semester	Course Title
4	F10AC	1	Applied Mathematics C
4	F10AM	1	Mathematical Biology A
4	F10MF	1	Functional Analysis
4	F10MM	1	Optimisation
4	F10NC	1	Numerical Analysis C
4	F10PC	1	Pure Mathematics C
4	F10AN	2	Mathematical Biology B
4	F10MP	2	Partial Differential Equations
4	F10ND	2	Numerical Analysis D
4	F10PD	2	Pure Mathematics D
4	F10PG	2	Geometry

F141 BSc (Hons) in Mathematics with Physics

Further Assistance

If you require further help in choosing your courses, please contact the course director Dr Robert Weston (R.A.Weston@hw.ac.uk).

Year/Stage 2

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
2	B28PO	1	Photonics and Optics
2	F18CD	1	Multivariable Calculus and Real Analysis A
2	F18CF	1	Linear Algebra
2	B28TP	2	Thermal Physics and Properties of Matter
2	F18CE	2	Multivariable Calculus and Real Analysis B
2	F18NA	2	Numerical Analysis A
2	F18PA	2	Pure Mathematics A

Optional Courses

Continuing students must choose F18AA Applied Mathematics A. Students entering directly into 2nd year may choose either course.

Year/Stage	Course Code	Semester	Course Title
2	F18AA	1	Applied Mathematics A
2	F18GD	1	Mathematics for Direct Entrants

Year/Stage 3

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
3	B29EM	1	Electromagnetism
3	F19PL	1	Abstract Algebra
3	F19GB	1	Project Preparation
3	F19MV	1	Vector Analysis
3	B29QS	2	Quantum Theory and Spectroscopy
3	F19AB	2	Applied Mathematics B
3	F19MO	2	Ordinary Differential Equations
3	F19MC	2	Complex Analysis

Optional Courses

There are no optional courses for this year

Year/Stage 4

Mandatory Courses

Year/ Stage	Course Code	Semester	Course Title
4	B29DR	1	Dynamics and Relativity
4	B29SS	2	Solid State Physics
4	F10GP	2	Mathematics Project Dissertation

Optional Courses

You must choose 3 mathematics courses from those listed in the first semester and two mathematics courses in the second semester.

Unfortunately, there are likely to be timetable clashes between some optional courses so that not all choices will be possible. Please contact the programme director before you make your choice of optional courses.

Year/ Stage	Course Code	Semester	Course Title
4	F10AC	1	Applied Mathematics C
4	F10AM	1	Mathematical Biology A
4	F10MF	1	Functional Analysis
4	F10MM	1	Optimisation
4	F10NC	1	Numerical Analysis C
4	F10PC	1	Pure Mathematics C
4	F10AN	2	Mathematical Biology B
4	F10PG	2	Geometry
4	F10MP	2	Partial Differential Equations
4	F10ND	2	Numerical Analysis D
4	F10PD	2	Pure Mathematics D

F181 BSc (Hons) in Mathematics with Computer Science

Further Assistance

If you require further help in choosing your courses, please contact the programme director Dr D Breit (D.Breit@hw.ac.uk)

Year/Stage 2

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
2	F18CD	1	Multivariable Calculus and Real Analysis A
2	F18CF	1	Linear Algebra
2	F17LP	1	Logic and Proof
2	F28PL	1	Programming Languages
2	F18CE	2	Multivariable Calculus and Real Analysis B
2	F18NA	2	Numerical Analysis A
2	F18PA	2	Pure Mathematics A
2	F28SD	2	Software Design

Optional Courses

There are no optional courses for this year.

Year/Stage 3

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
3	F19PL	1	Abstract Algebra
3	F19GB	1	Project Preparation
3	F29FA	1	Foundations 1
3	F19MO	2	Ordinary Differential Equations
3	F19MC	2	Complex Analysis
3	F29FB	2	Foundations 2

Optional/Elective Courses

Honours degree students must choose F19PB in Semester 1 and F19NB in Semester 2.

Optional Courses

Year/Stage	Course Code	Semester	Course Title
3	F19PB	1	Pure Mathematics B
3	F19NB	2	Numerical Analysis B

Year/Stage 4

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
4	F10GP	2	Mathematics Project Dissertation

Optional Courses

You have to choose one Computer Science course (with code beginning F2) and three Mathematics course (with code beginning F1) in Semester 1. You have to choose three optional Mathematics courses in Semester 2 (in addition of F10GP, which is mandatory). Unfortunately, there are likely to be timetable clashes between some Maths courses and some Computer Science courses so that not all choices will be possible. Please contact the programme director before you make your choice of optional courses.

Year/Stage	Course Code	Semester	Course Title
4	F10AC	1	Applied Mathematics C
4	F10AM	1	Mathematical Biology A
4	F10MF	1	Functional Analysis
4	F10MM	1	Optimisation
4	F10NC	1	Numerical Analysis C
4	F10PC	1	Pure Mathematics C
4	F29AI	1	Artificial Intelligence and Intelligent Agents
4	F20RS	1	Rigorous Methods for Software Engineering
4	F10AN	2	Mathematical Biology B
4	F10MP	2	Partial Differential Equations
4	F10ND	2	Numerical Analysis D
4	F10PD	2	Pure Mathematics D
4	F10PG	2	Geometry

F191 BSc (Hons) in Mathematics with a European Language

Further Assistance

If you require further help in choosing your courses, please contact the programme director Dr Martin Youngson (M.A.Youngson@ma.hw.ac.uk)

Year/Stage 2

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
2	F18CD	1	Multivariable Calculus and Real Analysis A
2	F18CF	1	Linear Algebra
2	F18CE	2	Multivariable Calculus and Real Analysis B
2	F18NA	2	Numerical Analysis A
2	F18PA	2	Pure Mathematics A

Optional Courses

Continuing students cannot choose F18GD Mathematics for Direct Entrants which may be taken only by students entering directly into 2nd year. Each continuing student must choose either F18AA, Applied Mathematics A or F17LP, Logic and Proof.

Each student must also choose a language option each semester. For students studying French the language options will be C48LF and C48MF. For students studying German the language options will be C48LG and C48MG. For students studying Spanish the language options will be C48LE and C48ME.

Year/Stage	Course Code	Semester	Course Title
2	F18AA	1	Applied Mathematics A
2	F18GD	1	Mathematics for Direct Entrants
2	F17LP	1	Logic and Proof
2	C48LE	1	Spanish Advanced 1
2	C48LF	1	French Advanced 1
2	C48LG	1	German Advanced 1
2	C48ME	2	Spanish Advanced 2
2	C48MF	2	French Advanced 2
2	C48MG	2	German Advanced 2

Year/Stage 3

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
3	F19YA	1	Year Abroad
3	F19YB	2	Year Abroad

Optional Courses

There are no optional courses in this year of the programme

Year/Stage 4

Mandatory Courses

There are no mandatory courses in this year of the programme.

Optional Courses

You should choose any four courses per semester. Unfortunately, there are likely to be timetable clashes between some optional courses so that not all choices will be possible. Please contact the programme director before you make your choice of optional courses.

Year/ Stage	Course Code	Semester	Course Title
4	F19PL	1	Abstract Algebra
4	F10AM	1	Mathematical Biology A
4	F10MF	1	Functional Analysis
4	F10MM	1	Optimisation
4	F10NC	1	Numerical Analysis C
4	F19MC	2	Complex Analysis
4	F10AN	2	Mathematical Biology B
4	F10PG	2	Geometry
4	F10MP	2	Partial Differential Equations
4	F10ND	2	Numerical Analysis D

F1A1 BSc (Hons) in Mathematics with Statistics

Further Assistance

If you require further help in choosing your courses, please contact the programme director Dr Martin Youngson (M.A.Youngson@ma.hw.ac.uk)

Year/Stage 2

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
2	F18CD	1	Multivariable Calculus and Real Analysis A
2	F18CF	1	Linear Algebra
2	F78PA	1	Probability and Statistics A
2	F18CE	2	Multivariable Calculus and Real Analysis B
2	F18NA	2	Numerical Analysis A
2	F18PA	2	Pure Mathematics A
2	F78PB	2	Probability and Statistics B

Optional Courses

Continuing students cannot choose F18GD Mathematics for Direct Entrants which may be taken only by students entering directly into 2nd year. Continuing students must choose either F18AA, Applied Mathematics A or F17LP, Logic and Proof.

Year/Stage	Course Code	Semester	Course Title
2	F18AA	1	Applied Mathematics A
2	F18GD	1	Mathematics for Direct Entrants
2	F17LP	1	Logic and Proof

Year/Stage 3

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
3	F19PL	1	Abstract Algebra
3	F79MA	1	Statistical Models A
3	F19MC	2	Complex Analysis
3	F19MO	2	Ordinary Differential Equations
3	F79MB	2	Statistical Models B

Optional/Elective Courses

You should choose both F19MV and F19PB in Semester 1 and one of F19AB or F19NB in Semester 2.

Optional Courses

Year/Stage	Course Code	Semester	Course Title
3	F19MV	1	Vector Analysis
3	F19PB	1	Pure Mathematics B
3	F19AB	2	Applied Mathematics B
3	F19NB	2	Numerical Analysis B

Year/Stage 4

Mandatory Courses

Year/ Stage	Course Code	Semester	Course Title
4	F79PS	1	Statistics for Social Science
4	F70TS	2	Time Series

Optional Courses

You should choose 3 mathematics courses from those listed in each semester. Unfortunately, there are likely to be timetable clashes between the mandatory and some optional courses so that not all choices will be possible. Please contact the programme director before you make your choice of optional courses.

Year/ Stage	Course Code	Semester	Course Title
4	F10AC	1	Applied Mathematics C
4	F10AM	1	Mathematical Biology A
4	F10MF	1	Functional Analysis
4	F10MM	1	Optimisation
4	F10NC	1	Numerical Analysis C
4	F10PC	1	Pure Mathematics C
4	F10AN	2	Mathematical Biology B
4	F10MP	2	Partial Differential Equations
4	F10ND	2	Numerical Analysis D
4	F10PD	2	Pure Mathematics D
4	F10PG	2	Geometry

F1B1 BSc (Hons) in Mathematics with Finance

Further Assistance

If you require further help in choosing your courses, please contact the programme director Prof Kevin Painter (K.Painter@hw.ac.uk)

Year/Stage 2

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
2	F18CD	1	Multivariable Calculus and Real Analysis A
2	F18CF	1	Linear Algebra
2	C38FM	1	Financial Markets Theory
2	F18CE2	2	Multivariable Calculus and Real Analysis B
2	F18NA	2	Numerical Analysis A
2	F18PA	2	Pure Mathematics A
2	C38FN	2	Corporate Financial Theory

Optional Courses

Continuing students cannot choose F18GD Mathematics for Direct Entrants which may be taken only by students entering directly into 2nd year. Each continuing student must choose either F18AA, Applied Mathematics A, C38FR Financial Reporting or F17LP, Logic and Proof.

Year/Stage	Course Code	Semester	Course Title
2	C38FR	1	Financial Reporting
2	F18AA	1	Applied Mathematics A
2	F18GD	1	Mathematics for Direct Entrants
2	F17LP	1	Logic and Proof

Year/Stage 3

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
3	C39SM	1	International Bond and Currency Markets
3	F19GB	1	Project Preparation
3	F19PL	1	Abstract Algebra
3	C39SN	2	Financial Derivatives
3	F19MC	2	Complex Analysis
3	F19MO	2	Ordinary Differential Equations

Optional/Elective Courses

You should choose **either** F19MV **or** F19PB in Semester 1 and **either** F19AB **or** F19NB in Semester 2.

Optional Courses

Year/Stage	Course Code	Semester	Course Title
3	F19MV	1	Vector Analysis
3	F19PB	1	Pure Mathematics B
3	F19AB	2	Applied Mathematics B
3	F19NB	2	Numerical Analysis B

Year/Stage 4

Mandatory Courses

Year/ Stage	Course Code	Semester	Course Title
4	C30SX	1	Risk Management and Derivatives
4	C30SY	2	Equity Markets and Fund Management
4	F10GP	2	Mathematics Project Dissertation

Optional Courses

You should choose three courses in the first semester and two courses in the second semester from those listed.

Year/ Stage	Course Code	Semester	Course Title
4	F10AC	1	Applied Mathematics C
4	F10AM	1	Mathematical Biology A
4	F10MF	1	Functional Analysis
4	F10MM	1	Optimisation
4	F10NC	1	Numerical Analysis C
4	F10PC	1	Pure Mathematics C
4	F10AN	2	Mathematical Biology B
4	F10MP	2	Partial Differential Equations
4	F10ND	2	Numerical Analysis D
4	F10PD	2	Pure Mathematics D
4	F10PG	2	Geometry

F1F1 BSc in Mathematical, Statistical and Actuarial Sciences

Further Assistance

If you require further help in choosing your courses, please contact the programme director Dr Martin Youngson (M.A.Youngson@ma.hw.ac.uk)

Year/Stage 2

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
2	F18CD	1	Multivariable Calculus and Real Analysis A
2	F18CF	1	Linear Algebra
2	F78AA	1	Actuarial and Financial Mathematics A
2	F78PA	1	Probability and Statistics A
2	F18CE	2	Multivariable Calculus and Real Analysis B
2	F78AB	2	Actuarial and Financial Mathematics B
2	F78PB	2	Probability and Statistics B

Optional Courses

If you have taken C37FF Finance and Financial Reporting in year 1, you must choose F18NA. Otherwise if you wish to have the opportunity to obtain an exemption from a Professional Actuarial Examination you should choose C37FF.

Year/Stage	Course Code	Semester	Course Title
2	F18NA	2	Numerical Analysis A
2	C37FF	2	Finance and financial reporting

Year/Stage 3

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
3	F19PL	1	Abstract Algebra
3	F79MA	1	Statistical Models A
3	F19MO	2	Ordinary Differential Equations
3	F79MB	2	Statistical Models B

Optional Courses

C27IE Introductory Economics, may be chosen only by students who have **not** previously taken the equivalent course C27OA Introductory Economics in year 1. If you have previously taken C27OA Introductory Economics in year 1, you are advised to take F19MV Vector Analysis and F19MC Complex Analysis in order to maximise the number of prerequisites for year 4 courses. If you have not previously taken Introductory Economics, and if you wish to have the opportunity to obtain an exemption from a Professional Actuarial Examination, you should choose it in place of F19MV. If you want to get the chance of exemptions from other Professional Actuarial Examinations, for your other stream of courses you should choose either Stochastic Processes and Survival Models or Life Insurance Mathematics A and B. Note that if you do not do Life Insurance Mathematics A and B in year 3 you may do it instead in year 4.

C37FF Finance and Financial Reporting may only be taken by students entering directly into stage 3.

There may be timetable clashes between mandatory courses and some of the other optional courses. Please contact the programme director if you have any questions about your choice of optional courses.

Year/ Stage	Course Code	Semester	Course Title
3	F19MV	1	Vector Analysis
3	F19PB	1	Pure Mathematics B
3	F79PA	1	Portfolio Theory and Asset Models
3	F79SP	1	Stochastic Processes
3	F70LA	1	Life Insurance Mathematics A
3	C27IE	1	Introductory Economics
3	F19AB	2	Applied Mathematics B
3	F19MC	2	Complex Analysis
3	F19NB	2	Numerical Analysis B
3	F79DF	2	Derivative Markets and Discrete Time Finance
3	F79SU	2	Survival Models
3	F70LB	2	Life Insurance Mathematics B
3	C37FF	2	Finance and financial reporting

Year/Stage 4

Mandatory Courses

There are no mandatory courses in this year of the course.

Optional Courses

You must choose at least one course starting with F1 and one course starting with F7 each semester (except in semester 1 where it is possible to take four courses starting with F1 provided one of these is F10MM, Optimisation.)

.If you have taken Life Insurance Mathematics A or B in Year 3 you cannot take Life Insurance Mathematics A or B in year 4. You can choose F70PE (Pensions) if and only if you choose F70LP (Life Office Practice).

F71AB Financial Mathematics may only be taken by students who entered directly into stage 3.

Unfortunately, there are likely to be timetable clashes between some optional courses so that not all choices will be possible. Your choice of optional courses will also depend on what you studied in year/stage 3. Please contact the programme director before you make your choice of optional courses.

Year/ Stage	Course Code	Semester	Course Title
4	F10AC	1	Applied Mathematics C
4	F10AM	1	Mathematical Biology A
4	F10MF	1	Functional Analysis
4	F10MM	1	Optimisation
4	F10NC	1	Numerical Analysis C
4	F10PC	1	Pure Mathematics C
4	F79PS	1	Statistics for Social Science
4	F70CF	1	Continuous-Time Finance
4	F71AB	1	Financial Mathematics
4	F70LA	1	Life Insurance mathematics A
4	F70PE	1	Pensions
4	F10AN	2	Mathematical Biology B
4	F10MP	2	Partial Differential Equations
4	F10ND	2	Numerical Analysis D
4	F10PD	2	Pure Mathematics D
4	F10PG	2	Geometry
4	F79BI	2	Bayesian Inference & Computational Methods
4	F70LB	2	Life Insurance Mathematics B
4	F70LP	2	Life Office Practice
4	F70RT	2	Risk Theory
4	F70TS	2	Time Series
4	F71TT	2	Risk Management: Techniques and Tools

F1G1 BSc in Mathematics and Computer Science

Further Assistance

If you require further help in choosing your courses, please contact the programme director Dr D Breit (D.Breit@hw.ac.uk)

Year/Stage 2

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
2	F18CD	1	Multivariable Calculus and Real Analysis A
2	F18CF	1	Linear Algebra
2	F28PL	1	Programming Languages
2	F17LP	1	Logic and Proof
2	F18CE	2	Multivariable Calculus and Real Analysis B
2	F18NA	2	Numerical Analysis A
2	F28HS	2	Hardware-Software Interface
2	F28SD	2	Software Design

Optional Courses

There are no optional courses for this year.

Year/Stage 3

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
3	F19PB	1	Pure Mathematics B
3	F19PL	1	Abstract Algebra
3	F29FA	1	Foundations 1
3	F29AI	1	Artificial Intelligence and Intelligent Agents
3	F19MO	2	Ordinary Differential Equations
3	F19NB	2	Numerical Analysis B
3	F29FB	2	Foundations 2
3	F29OC	2	Operating Systems and Concurrency

Optional Courses

There are no optional courses for this year.

Year/Stage 4

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
4	F20PA	1	Research Methods and Requirements Engineering
4	F20PB	2	Design & Implementation
4	F20PC	2	Project Testing and Presentation

Optional Courses

In Semester 1, you have to choose 2 Maths courses and 1 Computer Science course and in Semester 2, you have to choose 2 Maths courses. Unfortunately, there are likely to be timetable clashes between some Maths courses and some Computer Science courses so that not all choices will be possible. Please contact the programme director before you make your choice of optional courses.

Year/ Stage	Course Code	Semester	Course Title
4	F10AC	1	Applied Mathematics C
4	F10AM	1	Mathematical Biology A
4	F10MF	1	Functional Analysis
4	F10MM	1	Optimisation
4	F10NC	1	Numerical Analysis C
4	F10PC	1	Pure Mathematics C
4	F20DL	1	Data Mining and Machine Learning
4	F20CN	1	Computer Network Security
4	F20RS	1	Rigorous Methods for Software Engineering
4	F10AN	2	Mathematical Biology B
4	F10MP	2	Partial Differential Equations
4	F10ND	2	Numerical Analysis D
4	F10PD	2	Pure Mathematics D
4	F10PG	2	Geometry

F1H1 Master of Mathematics

Further Assistance

If you require further help in choosing your courses, please contact the Programme Director, Professor Andy White (A.R.White@hw.ac.uk).

Year/Stage 2

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
2	F18AA	1	Applied Mathematics A
2	F18CD	1	Multivariable Calculus and Real Analysis A
2	F18CF	1	Linear Algebra
2	F18CE	2	Multivariable Calculus and Real Analysis B
2	F18NA	2	Numerical Analysis A
2	F18PA	2	Pure Mathematics A

Optional Courses

You should choose one optional course each semester. F17SC can only be chosen if you did not take this course in Year 1.

F18GD Mathematics for Direct Entrants may be chosen only by students entering directly into 2nd year.

Before you can choose C38FR, C38FM, C38MO, C38FN or C38SE you have to have a grade D or above in C37FF.

Before you can choose B28PO or B28TP you have to have a grade D or above in B27MW and B27FF.

Due to timetabling reasons it is unlikely that it will be possible to choose C28EP or C38SE during the academic year 2018/19.

Year/Stage	Course Code	Semester	Course Title
2	B28PO	1	Photonics and Optics
2	C38FM	1	Financial Markets Theory
2	C38FR	1	Financial Reporting
2	F18GD	1	Mathematics for Direct Entrants
2	F27IS	1	Interactive Systems
2	F78PA	1	Probability and Statistics A
2	F17LP	1	Logic and Proof
2	B28TP	2	Thermal Physics and Properties of Matter
2	C28EP	2	Contemporary Economic Policy and Institutions
2	C38FN	2	Corporate Financial Theory
2	C38MO	2	Management Accounting in Organisations
2	C38SE	2	Social and Environmental Accounting
2	F17SC	2	Discrete Mathematics
2	F18GW	2	Mathematics Workshop
2	F27WD	2	Web Design and Databases
2	F78PB	2	Probability and Statistics B
2	F78SC	2	Statistics for Science

Year/Stage 3

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
3	F19GB	1	Project Preparation
3	F19MV	1	Vector Analysis
3	F19PB	1	Pure Mathematics B
3	F19PL	1	Abstract Algebra
3	F19AB	2	Applied Mathematics B
3	F19MC	2	Complex Analysis
3	F19MO	2	Ordinary Differential Equations
3	F19NB	2	Numerical Analysis B

Optional Courses

There are no optional courses for this year.

Year/Stage 4

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
4	F10GP	2	Mathematics Project Dissertation

Optional Courses

You have to choose four courses in the first semester and three courses in the second semester. To increase your course choice next year (Year 5) you are strongly recommended to choose at least 1 of F10AC or F10PC in semester 1. Choosing F10PD in semester 2 will also increase your course choice in Year 5. Please contact the 4th year Director of Studies Professor K Painter before you make your choice of optional courses.

Year/Stage	Course Code	Semester	Course Title
4	F10AC	1	Applied Mathematics C
4	F10AM	1	Mathematical Biology A
4	F10MF	1	Functional Analysis
4	F10MM	1	Optimisation
4	F10NC	1	Numerical Analysis C
4	F10PC	1	Pure Mathematics C
4	F10AN	2	Mathematical Biology B
4	F10MP	2	Partial Differential Equations
4	F10ND	2	Numerical Analysis D
4	F10PD	2	Pure Mathematics D
4	F10PG	2	Geometry

Year/Stage 5

Mandatory Courses

Year/ Stage	Course Code	Semester	Course Title
5	F11GS	1	Mathematics Project Dissertation Part 2

Optional Courses

You have to choose three courses in the first semester and four courses in the second semester. You may not choose courses which have a large overlap with those you have previously studied in year 4, for example you cannot choose F11NC if you previously have studied F10NC. You cannot choose F11AL if you have previously taken F19NB. Unfortunately, there are likely to be timetable clashes between some of the courses so that not all choices will be possible. Please contact the 5th year Director of Studies Professor K Painter before you make your choice of optional courses.

Year/ Stage	Course Code	Semester	Course Title
5	F11AE	1	Applied Mathematics E
5	F11AM	1	Mathematical Ecology
5	F11FM	1	Functional Analysis
5	F11MM	1	Optimisation
5	F11MT	1	Modelling and Tools
5	F11NC	1	Numerical ODEs
5	F11PE	1	Pure Mathematics E
5	F11MS	1	Modelling and Simulation in the Life Sciences
5	F11AL	2	Applied Linear Algebra
5	F11AN	2	Mathematical Biology and Medicine
5	F11AS	2	Dynamical Systems
5	F11MP	2	Partial Differential Equations
5	F11ND	2	Numerical Analysis (PDEs)
5	F11PF	2	Pure Mathematics F
5	F11PG	2	Geometry
5	F11SS	2	Stochastic Simulation
5	F11DA	2	Data Assimilation with Applications to Climate Change

F1J1 BSc in Mathematical, Statistical and Actuarial Sciences with Diploma in Industrial Training

Further Assistance

If you require further help in choosing your courses, please contact the programme director Dr Martin Youngson (M.A.Youngson@ma.hw.ac.uk)

Year/Stage 2

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
2	F18CD	1	Multivariable Calculus and Real Analysis A
2	F18CF	1	Linear Algebra
2	F78AA	1	Actuarial and Financial Mathematics A
2	F78PA	1	Probability and Statistics A
2	F18CE	2	Multivariable Calculus and Real Analysis B
2	F78AB	2	Actuarial and Financial Mathematics B
2	F78PB	2	Probability and Statistics B

Optional Courses

If you have taken C37FF Finance and Financial Reporting in year 1, you must choose F18NA. Otherwise if you wish to have the opportunity to obtain an exemption from a Professional Actuarial Examination you should choose C37FF.

Year/Stage	Course Code	Semester	Course Title
2	F18NA	2	Numerical Analysis A
2	C37FF	2	Finance and financial reporting

Year/Stage 3

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
3	F19PL	1	Abstract Algebra
3	F79MA	1	Statistical Models A
3	F19MO	2	Ordinary Differential Equations
3	F79MB	2	Statistical Models B

Optional Courses

C27IE Introductory Economics, may be chosen only by students who have **not** previously taken the equivalent course C27OA Introductory Economics in year 1. If you have previously taken C27OA Introductory Economics in year 1, you are advised to take F19MV Vector Analysis and F19MC Complex Analysis in order to maximise the number of prerequisites for year 4 courses. If you have not previously taken Introductory Economics, and if you wish to have the opportunity to obtain an exemption from a Professional Actuarial Examination, you should choose it in place of F19MV. If you want to get the chance of exemptions from other Professional Actuarial Examinations, for your other stream of courses you should choose either Stochastic Processes and Survival Models or Life Insurance Mathematics A and B. Note that if you do not do Life Insurance Mathematics A and B in year 3 you may do it instead in year 4.

C37FF Finance and Financial Reporting may only be taken by students entering directly into stage 3.

There may be timetable clashes between mandatory courses and some of the other optional courses. Please contact the programme director if you have any questions about your choice of optional courses.

Year/Stage	Course Code	Semester	Course Title
3	F19MV	1	Vector Analysis
3	F19PB	1	Pure Mathematics B
3	F79PA	1	Portfolio Theory and Asset Models
3	F79SP	1	Stochastic Processes
3	F70LA	1	Life Insurance Mathematics A
3	C27IE	1	Introductory Economics
3	F19AB	2	Applied Mathematics B
3	F19MC	2	Complex Analysis
3	F19NB	2	Numerical Analysis B
3	F79DF	2	Derivative Markets and Discrete Time Finance
3	F79SU	2	Survival Models
3	F70LB	2	Life Insurance Mathematics B
3	C37FF	2	Finance and financial reporting

Year/Stage 4

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
4	F18ZA	1	Industrial Training Placement A
4	F18ZB	2	Industrial Training Placement B

There are 2 mandatory (60-credit courses) for the Diploma in Industrial Training. Students spend a year in industrial placement.

Optional Courses

There are no optional courses for this year.

Year/Stage 5

Mandatory Courses

There are no mandatory courses in this year of the course.

Optional Courses

You must choose at least one course starting with F1 and one course starting with F7 each semester (except in semester 1 where it is possible to take four courses starting with F1 provided one of these is F10MM1, Optimisation.)

If you have taken Life Insurance Mathematics A or B in Year 3 you cannot take Life Insurance Mathematics A or B in year 4. You can choose F70PE (Pensions) if and only if you choose F70LP (Life Office Practice).

F71AB Financial Mathematics may only be taken by students who entered directly into stage 3.

Unfortunately, there are likely to be timetable clashes between some optional courses so that not all choices will be possible. Your choice of optional courses will also depend on what you studied in year/stage 3. Please contact the programme director before you make your choice of optional courses.

Year/Stage	Course Code	Semester	Course Title
4	F10AC	1	Applied Mathematics C
4	F10AM	1	Mathematical Biology A

4	F10MF	1	Functional Analysis
4	F10MM	1	Optimisation
4	F10NC	1	Numerical Analysis C
4	F10PC	1	Pure Mathematics C
4	F79PS	1	Statistics for Social Science
4	F70CF	1	Continuous-Time Finance
4	F71AB	1	Financial Mathematics
4	F70LA	1	Life Insurance mathematics A
4	F70PE	1	Pensions
4	F10AN	2	Mathematical Biology B
4	F10MP	2	Partial Differential Equations
4	F10ND	2	Numerical Analysis D
4	F10PD	2	Pure Mathematics D
4	F10PG	2	Geometry
4	F79BI	2	Bayesian Inference & Computational Methods
4	F70LB	2	Life Insurance Mathematics B
4	F70LP	2	Life Office Practice
4	F70RT	2	Risk Theory
4	F70TS	2	Time Series
4	F71TT	2	Risk Management: Techniques and Tools

F1K1 BSc (Hons) in Mathematics with Finance with Industrial Diploma

Further Assistance

If you require further help in choosing your courses, please contact the programme director Professor Kevin Painter (K.Painter@hw.ac.uk)

Year/Stage 2

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
2	F18CD	1	Multivariable Calculus and Real Analysis A
2	F18CF	1	Linear Algebra
2	C38FM	1	Financial Markets Theory
2	F18CE2	2	Multivariable Calculus and Real Analysis B
2	F18NA	2	Numerical Analysis A
2	F18PA	2	Pure Mathematics A
2	C38FN	2	Corporate Financial Theory

Optional Courses

Continuing students cannot choose F18GD Mathematics for Direct Entrants which may be taken only by students entering directly into 2nd year. Each continuing student must choose either F18AA, Applied Mathematics A, C38FR Financial Reporting or F17LP, Logic and Proof.

Year/Stage	Course Code	Semester	Course Title
2	C38FR	1	Financial Reporting
2	F18AA	1	Applied Mathematics A
2	F18GD	1	Mathematics for Direct Entrants
2	F17LP	1	Logic and Proof

Year/Stage 3

Mandatory Courses

Year/Stage	Course Code	Semester	Course Title
3	C39SM	1	International Bond and Currency Markets
3	F19GB	1	Project Preparation
3	F19PL	1	Abstract Algebra
3	C39SN	2	Financial Derivatives
3	F19MC	2	Complex Analysis
3	F19MO	2	Ordinary Differential Equations

Optional Courses

You should choose **either** F19MV **or** F19PB in Semester 1 and **either** F19AB **or** F19NB in Semester 2

Optional Courses

Year/Stage	Course Code	Semester	Course Title
3	F19MV	1	Vector Analysis
3	F19PB	1	Pure Mathematics B
3	F19AB	2	Applied Mathematics B
3	F19NB	2	Numerical Analysis B

Year/Stage 4

Mandatory Courses

Year/ Stage	Course Code	Semester	Course Title
4	F18ZA	1	Industrial Training Placement A
4	F18ZB	2	Industrial Training Placement B

There are 2 mandatory (60-credit courses) for the Diploma in Industrial Training. Students spend a year in industrial placement.

Optional Courses

There are no optional courses for this year.

Year/Stage 5

Mandatory Courses

Year/ Stage	Course Code	Semester	Course Title
5	C30SX	1	Risk Management and Derivatives
5	C30SY	2	Equity Markets and Fund Management
5	F10GP	2	Mathematics Project Dissertation

Optional Courses

You should choose three courses in the first semester and two courses in the second semester from those listed.

Year/ Stage	Course Code	Semester	Course Title
5	F10AC	1	Applied Mathematics C
5	F10AM	1	Mathematical Biology A
5	F10MF	1	Functional Analysis
5	F10MM	1	Optimisation
5	F10NC	1	Numerical Analysis C
5	F10PC	1	Pure Mathematics C
5	F10AN	2	Mathematical Biology B
5	F10MP	2	Partial Differential Equations
5	F10ND	2	Numerical Analysis D
5	F10PD	2	Pure Mathematics D
5	F10PG	2	Geometry

F111 Mathematical Studies

It is essential that you consult the Programme Director
Dr Martin Youngson (M.A.Youngson@ma.hw.ac.uk) before attempting
online enrolment.