

INFORMATION FOR STUDENTS ENTERING YEAR 1 IN ACADEMIC SESSION 2022/23

(Supplement to Student Handbook)

INTRODUCTION	2
DEPARTMENTAL WEBSITE	2
CALENDAR OF DATES	3
GENERAL INFORMATION: MATHEMATICS AND STATISTICS.....	3
CONTACT INFORMATION.....	4
JOINT DEGREE CONTACTS.....	5
GETTING STARTED	6
FIRST YEAR CURRICULA 2021 - 2022.....	8
YEAR 1 COURSE REGULATIONS	13
SYLLABUS INFORMATION	22

Note: the information contained herein may be subject to change. (For example, the Department reserves the right to alter the list of modules available, the semester in which modules are delivered or degree course structures.)

INTRODUCTION

This supplementary handbook has two aims:

1. To give you the information you need about the first year of the Department of Mathematics and Statistics degree courses.
2. To offer advice on how to get the best out of your chosen course.

In particular, we will discuss the structure of the first year of our undergraduate degree courses; we will provide information on how we teach and how you should learn; we will give information about examinations and assessments; and we will explain how you can express your views to us and where to seek help.

Further information for Year 1 students can be found in the University Student Handbook, the Department's Student Handbook and the University web pages.

The contents of this handbook are, as far as possible, up to date and accurate at the date of publication. The web links quoted were available on 30/08/2022. Please note that the University reserves the right to add to, amend, or withdraw modules, courses and facilities, to restrict student numbers and to make any other alterations, as it may deem desirable and necessary. Any such changes will be incorporated in the next edition of the University Calendar:

www.strath.ac.uk/studywithus/academicregulations

Please read the regulations for your degree course carefully, in particular, the information about compulsory and elective modules available to you in Year 1, and progress requirements.

DEPARTMENTAL WEBSITE

Information about the Department of Mathematics and Statistics is provided online at:

www.strath.ac.uk/science/mathematicsstatistics

The site also contains links to pages for individual modules and other useful information.

CALENDAR OF DATES

Year 1 modules are taught in two semesters each consisting of an 11-week teaching block followed by a Revision and Assessment Period:-

- **First Semester**

Welcome & Development Week: Monday 12th — Friday 16th September 2022
 Teaching Block: Monday 19th September — Friday 2nd December 2022
 Revision & Assessment: Monday 5th — Friday 16th December 2022
 Student Holiday: Monday 19th December — Friday 6th January 2023
 (Public holiday: Monday 26th September)

- **Second Semester**

Consolidation & Development Week: Monday 9th — Friday 13th January 2023
 Teaching Block: Monday 16th January — Friday 31st March 2023
 Student Holiday: Monday 3rd — Friday 14th April 2023
 Revision & Assessment: Monday 17th April — Friday 19th May 2023
 (Easter Monday: Monday 10th April)

- **Resit Examination Diet**

Wednesday 26th July — Tuesday 8th August 2023

Permission to resit is not automatic, being subject to the approval of the appropriate Board of Examiners.

GENERAL INFORMATION: MATHEMATICS AND STATISTICS

Information for students about all the modules and courses provided by the Department of Mathematics and Statistics can be found via a class on Myplace called:

Mathematics & Statistics: Information for Current Students

All students on our degree courses are automatically enrolled on this Myplace page.

CONTACT INFORMATION

Departmental Office

Should you need to contact us by mail or telephone, the address and telephone numbers are as follows:

Department of Mathematics and Statistics
University of Strathclyde
Room LT916
Livingstone Tower
26 Richmond Street
Glasgow, G1 1XH.

Telephone: 0141 548 3804
Email: contact-mathematics@strath.ac.uk

Key Staff Contacts 2022/2023

Members of staff in the department have office on levels 8, 9 and 10 in the Livingstone Tower. You can find a complete list of contact details on the Department's web pages. The office location, telephone extension and email address of some key staff are listed below.

Head of Department

Prof John MacKenzie	LT1009	3668	j.a.mackenzie@strath.ac.uk
---------------------	--------	------	--

Undergraduate Teaching Director

Dr Geoff McKay	LT1027	3660	g.mckay@strath.ac.uk
----------------	--------	------	--

Year 1 Coordinator

Dr Lindsey Corson	LT1008	3547	lindsey.corson@strath.ac.uk
-------------------	--------	------	--

Department Administrator

Ms Sandra Miller	LT914	3598	s.j.miller@strath.ac.uk
------------------	-------	------	--

If you have a problem or request, it is usually best to speak first with a module lecturer or your Personal Development Adviser. The Department's Administrator or secretarial staff can also deal with many routine enquiries.

All members of staff can be contacted on the University's internal phone system with the given extension. From off campus, these numbers should be prefixed by (0141) 548. However, we recommend that you try emailing a member of staff before contacting them by phone.

JOINT DEGREE CONTACTS

The departmental offices for students on joint degree courses are located in the following buildings.

Computer & Information Sciences: Livingstone Tower, Level 11

Mathematics, Science & Technological Education (a Division of the School of Education): Lord Hope Building, Level 5

Physics: John Anderson Building, Level 8

Accounting & Finance: Stenhouse Wing, Business School, Level 3

Economics: Duncan Wing, Business School, Level 5

Management Science (Business Analysis): Duncan Wing, Business School, Level 7

All joint degree enquiries should be addressed to the Mathematics and Statistics Year 1 Coordinator in the first instance. However, should you need to contact someone from the above departments then please use one of the following contacts.

Mathematics & Computer Science/Data Analytics

Ms I. Ross: isla.ross@strath.ac.uk

Mathematics & Physics

Dr A. Yao: alison.yao@strath.ac.uk

Mathematics with Teaching

Mr J. Winter: john.winter@strath.ac.uk

Mathematics, Statistics and Business Analysis

Mr K. Koutsouradis: konstantinos.koutsouradis@strath.ac.uk

Mathematics, Statistics and Accounting

Mr C. McLaughlin: craig.mclaughlin@strath.ac.uk

Mathematics, Statistics and Economics

Dr S. Davidson: sharada.n.davidson@strath.ac.uk

Mathematics, Statistics and Finance

Ms J. Thamm: juliane.thamm@strath.ac.uk

GETTING STARTED

The Welcome and Development Week (week 0) will start on Monday, 12th September and details of some of the key departmental events are listed below. Lectures and other classes start on Monday, 19th September and by the end of week 0 you should have a good idea of where and when your classes will be held. Please note, however, that arrangements may change in response to timetable changes and guidance from the Scottish Government (regarding social distancing).

Department Induction

Details of the Department's induction events are given below.

Tuesday, 13th September: Induction lecture in RC512 (Royal College), 10:00 - 11.30am.

Wednesday, 14th September: Meeting with your Personal Development Adviser. Details of the meeting will be sent to you by email.

Information about the above events will be sent to your University email account, so please ensure that you are checking this on a regular basis.

Timetables

You can access the University timetables here:

www.strath.ac.uk/professionalservices/timetables

You can search for individual module timetables as well as the timetable for your chosen degree. Once the Year 1 Coordinator has approved your curriculum (usually by the end of the welcome week), you will be able to access your personalised timetable via Myplace and the Strathclyde app.

Student Inauguration Ceremony

This year's commencement ceremony for Science students will take place in the Barony Hall on Wednesday 14th September between 11:15 and 11:45am. The ceremony will include an address from the Principal, Professor Sir Jim McDonald.

Student Cards

Your student card is your primary form of identification within the University and you'll need to keep it safe throughout your time at Strathclyde. You can collect your student card from the Helpdesk on level 4 of the Learning and Teaching building by making an appointment via the booking system. Everything you need to know about collecting your card, including a link to the booking system, can be found here:

www.strath.ac.uk/studywithus/strathlife/onarrival/

Personal Development Adviser

You will be allocated a Personal Development Adviser (PDA) who will stay with you throughout your undergraduate studies. Your PDA will be a member of academic staff in the Department who will be a key contact should you need to discuss any matters, either academic or personal, that are adversely affecting your studies. Your PDA will discuss these matters with you in confidence and, if need be, put you in touch with an appropriate support service (e.g., Student Finance, Disability and Wellbeing Service, etc.) or another colleague (e.g., the Year 1 Coordinator) to address the issue.

You will meet your PDA at the start of each session, and again later in the session, usually after the publication of any exam results. If, however, you are worried about anything at all, do not wait: go and speak to your PDA. Students who are experiencing difficulty with their work, who feel that unreasonable demands are being made of them, or who find that they are being hindered by medical, domestic, financial, or other problems, should consult their PDA as soon as possible. Experience shows that problems that seem very serious can often be resolved if discussed at an early stage.

Student Support

The University's Student Support and Wellbeing Service represents a network of staff able to provide expert help and counselling on any problem whether academic, personal or financial. More information about the support and services on offer can be found at the following website:

www.strath.ac.uk/professionalservices/sees

FIRST YEAR CURRICULA 2021 - 2022

Curriculum Information

The curriculum for each course comprises:

1. Compulsory Modules;
2. Optional Modules (chosen from a list of modules decided by the Department);
3. Elective Modules (chosen from any of the modules offered by the University).

Curriculum information for all of our degree courses can be found on pages 14 – 21 of this document and syllabus information for compulsory level 1 Mathematics and Statistics modules is given on pages 22 - 29. Information about compulsory modules for joint degree courses is available from the University Class Catalogue (<http://classcat.strath.ac.uk/>) or from the website of the parent department that runs the module.

Each year, you need to take modules amounting to no fewer than 120 credits. In Year 1, most of these modules are compulsory, but some students will need to choose 10 or 20 credits of elective modules. You can choose any level one module offered by the University providing that you satisfy the prerequisites of the module and providing that it does not clash with any of your compulsory modules.

Elective Modules

Popular elective modules include Accountancy, Economics and Business Analysis, Finance, History, Law, Modern Languages, Politics, and Psychology as well as modules offered by departments in the Faculty of Science.

The Mathematics & Statistics 10 credit modules MM106, MM107, MM108, MM109, MM123 and MM124 may be chosen as electives if not already compulsory for your course. Note that MM106 and MM107 cover the first and second semesters, respectively, of MM104, while MM123 and MM124 cover the first and second halves, respectively, of the second semester module MM103.

Transfer between Undergraduate Courses

The opportunities that exist to transfer between undergraduate degree courses occur primarily at the beginning, in the middle and at the end of your first year (and at the end of your second year). Transfer possibilities naturally become more limited as time passes although transfer to the single subject course in Mathematics (or Mathematics and Statistics from Year 4) is sometimes possible right up to the start of the final year.

If, at any stage, you are considering changing your degree course then you should consult with your PDA and/or the Year 1 Coordinator as soon as possible.

BSc Hons Mathematics with Teaching

The education component of the BSc Hons Mathematics with Teaching course does not start until Year 4. In Years 1 and 2, you follow the BSc Hons Mathematics curriculum and in Year 3 you study a mixture of level 3 and level 4 Mathematics and Statistics modules. This means that if you wish to transfer to the joint degree in Mathematics with Teaching then you **must** do so by the end of Year 2. Your transfer may be conditional on having a successful interview with staff from the School of Education. Furthermore, school placements and registration with the General Teaching Council for Scotland (GTCS) require that you have not had any convictions that might prejudice your involvement with children, and to this effect you must be a member of the Protection of Vulnerable Groups scheme. Finally, to enter an Initial Teacher Education course in Scotland you are required to have a pass in the **SQA Higher English** course, or equivalent.

Note that a student wishing to enter the teaching profession may alternatively take the yearlong Professional Graduate Diploma in Education (Secondary) once they have gained an undergraduate degree.

BSc Hons Mathematics, Statistics and Accounting

This course can lead to a fully accredited accounting qualification if you pass certain modules with a mark of at least 50%. In Year 1, these modules are the 20-credit compulsory module AG111 Accounting Technologies and the 20-credit optional module AG105 Introduction to Finance and Financial Statistics. We strongly recommend that you choose AG105 as your elective module. The accredited degree leads to exemptions from examinations set by the Institute of Chartered Accountants of Scotland.

Students wishing to transfer to BSc Hons Mathematics, Statistics and Accounting must start the course in Year 1 for accreditation reasons and they must meet the higher entry requirements (as published on the Department's website).

Voluntary Withdrawal

If a student wishes to withdraw from their course, then they will need to contact Student Business (studentbusiness-science@strath.ac.uk) to notify them of their decision. Students should also notify their Local Education Authority or sponsor of their withdrawal and the Student Loans Company if they have taken out a loan.

We recommend that if you are considering withdrawing from your course then you first contact your PDA or the Year 1 Coordinator to discuss the matter, as other options (e.g., Voluntary Suspension) may be available to you.

Part-Time Study

Students may study BSc Hons Mathematics, BSc Hons Mathematics and Physics, BSc Mathematics, Statistics and Economics, or the first two years of the BSc Hons Mathematics with Teaching course on a part-time basis. If full-time study proves too much then it may be possible to apply to transfer to one of the above courses rather than leave the University. Contact the Year 1 Coordinator for more information.

Attendance at Classes

You will find that the atmosphere at University is probably more relaxed than that at your previous school or college. However, you should be aware that the University (General Academic Regulations 20-23) and the Student Awards Agency for Scotland (SAAS), or your Local Education Authority (LEA), require you to be here and to attend classes - you must be here during semesters and only compelling mitigating circumstances can excuse absence from classes. Staff responsible for each module will monitor attendance as appropriate. *It is a student's responsibility to ensure that their attendance has been recorded.* The Head of Department (or Nominee) can report an unsatisfactory attendance record to the Science Faculty Board of Study, which, in certain circumstances, may result in a report being sent to the SAAS or your LEA.

Additionally, students are required to perform satisfactorily the work of the module. Where laboratory work is an integral part of a module it is clearly important to attend regularly and to complete the scheme of work required. **In some modules, the award of the credit is dependent upon satisfactory coursework being carried out in addition to the written examination being passed.** Any student whose attendance or performance has not been satisfactory may be deemed 'Not Qualified' to sit the examination and hence disqualified from the degree examination in the module concerned.

Additional work will normally be required in order for a Not Qualified student to be reinstated for a subsequent attempt at a degree examination.

Your Responsibility as a Student

As a student, we expect you to attend classes in a respectful manner (for example, make sure you arrive promptly and turn off your phone), and to carry out assignments and submit them timeously. We also expect you to observe good conduct at all times and to treat your fellow students with consideration. University facilities (computers, library, etc.) should be used responsibly and you should inform us of changes in your address. Finally, we expect and encourage you to spend an appropriate amount of time on private study.

Above all, a key responsibility is to make the best of the learning opportunities afforded by the University. We want all students to progress successfully through their course and graduate with a degree that is a true reflection of their ability.

Compulsory Withdrawal

A student who persistently does not attend classes may be reported to the Board of Study and may have their registration terminated and be required to withdraw from their course (See Regulation 94 of the General Academic Regulations). The criteria for reporting shall be: (i) a significant and persistent failure to attend or engage with programme requirements has been confirmed by the appropriate Department/School or Programme; (ii) the student has been offered appropriate opportunities to redeem their position, including the offer of support in cases of significant personal difficulties

Feedback to Students

The Department of Mathematics and Statistics recognises the value to students of feedback and is therefore committed to providing timely and appropriate feedback. To get the best out of feedback you need to be actively engaged in your studies. Feedback is only helpful if the information/comments are used by yourself to improve your future performance. Through feedback, you should learn from your mistakes and misconceptions, and build on achievements.

Feedback will help you identify gaps in your understanding and enable you to seek help and clarification when you need it. Individual advice can be obtained at the tutorial/problems classes. Alternatively, you can arrange to consult your lecturer/tutor. Staff will endeavour to return within 15 days, during the teaching period, work you submit on time. In many modules, this will be within a week.

Feedback may take many forms, for example:

- (i) Written or oral comments on work submitted.
- (ii) The supply of model solutions in class or via Myplace.
- (iii) Grading of submitted work (normally in conjunction with (ii)).

Feedback on examinations may be given by providing a generic commentary on students' performance (identifying common strengths and weaknesses) along with comments on those parts of questions that need particular attention.

Student- Staff Liaison Committee

The Faculty Board of Study, which is the University committee that manages Science Faculty business, has student representatives. They change from time to time, but the Faculty Manager can tell you who the current representatives are. The Department of Mathematics and Statistics also has a Departmental Student-Staff Committee with representatives from each year of study. Minutes are kept of its actions and these are available on Myplace. The results of these actions are scrutinised at Departmental Meetings and the Faculty of Science Academic Administration Committee. The committee is formed in October from willing volunteers. The members are listed on Departmental notice boards and may be contacted by email or through Myplace.

The line of student-staff communication may be defined as follows:

- Issues of student concern associated with particular modules (including individual student difficulties) should, in the first instance, be raised with the lecturer in charge. If these issues cannot be resolved, students should then communicate their concern to the appropriate Year Coordinator. Unresolved issues should then be raised at the Student-Staff Committee meetings and, as a last stage, students may take particular issues to the Head of Department.
- Issues concerning the organisation of a particular year of a course or the operation of an entire course in general should be raised directly with the appropriate Year Coordinator. Once again, unresolved issues should then be communicated in the Student-Staff Committee meetings and ultimately to the Head of Department.

YEAR 1 COURSE REGULATIONS

Course regulations are to be read in conjunction with the General Academic Regulations, a selection of whose content is given below. See the following link for the full list of regulations:

www.strath.ac.uk/media/1newwebsite/documents/academicregulations/UG_General_Regulations.pdf

General Academic Regulations

Undergraduate, Integrated Masters and Professional Graduate Degree Programme Level

14 Modes of Study

Programmes may be offered on a full-time and/or part-time basis however part-time study is not available to certain groups, such as visa holding students.

At the discretion of the relevant Board of Study, on the recommendation of the relevant Head of Department/School (or their nominee), a student may transfer from full-time to part-time study and vice-versa where an appropriate programme is available. At this time, the relevant minimum and maximum periods of study will be reviewed. For some students, transfer from full-time to part-time study will be prohibited, in line with UK Visa & Immigration (UKVI) compliance requirements.

Part-time students will follow a pattern of working in line with that of full-time students, on a pro-rata basis.

.....

65 Progress of Students

To progress to the second year of a chosen course a student must have accumulated a minimum of 20 credits fewer than the total number of credits specified by the course curriculum at first year.

.....

70 A student studying on a part-time basis must satisfy the appropriate progress requirements following each period of the equivalent full time credit load. More detailed progress regulations may be specified in individual course regulations.

71 A student studying on a part-time basis shall not normally proceed to the next year of study with more than 20 credits outstanding.

.....

103 Award

To be awarded a Certificate of Higher Education a student must have accumulated no fewer than 120 credits with at least 100 credits at Level 1.

Mathematics

MMath in Mathematics, MMath in Mathematics and Statistics
BSc (with Honours) in Mathematics
BSc (with Honours) in Mathematics and Statistics
BSc (with Honours) in Mathematics with Teaching
BSc (with Honours) in Mathematics with Teaching (International)
Diploma/Certificate of Higher Education in Mathematical Studies

Curriculum (Full-time study)

First Year

All full-time students shall undertake modules amounting to 120 credits as follows:

Compulsory Modules	Level	Credits
MM101 Introduction to Calculus	1	20
MM102 Applications of Calculus	1	20
MM103 Geometry and Algebra with Applications	1	20
MM104 Statistics and Data Presentation	1	20
MM108 Applying Mathematics 1	1	10
MM109 Applying Mathematics 2	1	10
Elective Module(s)		20

.....

Curriculum (Part-time study)

Students studying on a part-time basis will normally take modules amounting to 60 credits in each year.

Progress

To progress to the second year of either the MMath or Bachelor with Honours degrees in addition to satisfying the requirements of General Academic Regulation 65, students must gain passes in *MM101 Introduction to Calculus* and *MM102 Applications of Calculus*.

To progress to second year of the Bachelor degree General Academic Regulation 65 shall apply.

.....

Progress (Part-time study)

General Academic Regulations 65 and 71 shall apply.

.....

Award

Certificate of Higher Education in Mathematical Studies: General Academic Regulation 103 shall apply.

Mathematics and Computer Science

BSc (with Honours) in Mathematics and Computer Science Diploma/Certificate of Higher Education in Mathematics and Computer Science

Mode of Study

The courses are available by full-time study.

Curriculum

First Year

All full-time students shall undertake modules amounting to 130 credits as follows:

Compulsory Modules	Level	Credits
MM101 Introduction to Calculus	1	20
MM102 Applications of Calculus	1	20
MM106 Essential Statistics	1	10
MM123 Geometry and Algebra	1	10
CS103 Machines, Languages and Computation	1	20
CS104 Information and Information System	1	20
CS105 Programming Foundations	1	20
Elective Module(s)		10

.....

Progress

In order to progress to the second year of the Honours course in addition to satisfying the requirements of General Academic Regulation 65, students must also gain passes in the following modules: *MM101 Introduction to Calculus* and *MM102 Applications of Calculus*.

To progress to second year of the Bachelor degree General Academic Regulation 65 shall apply.

.....

Award

Certificate of Higher Education: In order to qualify for the award of a Certificate of Higher Education in Mathematics and Computer Science General Academic Regulation 103 shall apply.

Mathematics and Physics

BSc (with Honours) in Mathematics and Physics Diploma/Certificate of Higher Education in Maths and Physics

Curriculum (Full-time study)

First Year

All full-time students shall undertake modules amounting to 120 credits as follows:

Compulsory Modules	Level	Credits
MM101 Introduction to Calculus	1	20
MM102 Applications of Calculus	1	20
MM106 Essential Statistics	1	10
MM123 Geometry and Algebra	1	10
PH180 Experimental Physics	1	20
PH183 Mechanics, Optics and Waves	1	20
PH184 Quantum Physics and Electromagnetism	1	20

.....

Curriculum (Part-time study)

Students studying on a part-time basis will normally take modules amounting to 60/70 credits in each year.

Progress

In order to progress to the second year of the Honours course in addition to satisfying the requirements of General Academic Regulation 65 student must also gain passes in the following modules: *MM101 Introduction to Calculus* and *MM102 Applications of Calculus*.

To progress to second year of the Bachelor degree General Academic Regulation 65 shall apply.

.....

Progress (Part-time study)

General Academic Regulations 65 and 71 shall apply.

.....

Award

Certificate of Higher Education: In order to qualify for the award of a Certificate of Higher Education in Mathematics and Physics General Academic Regulation 103 shall apply.

Mathematics, Statistics and Accounting

BSc (with Honours) in Mathematics, Statistics and Accounting Certificate/Diploma of Higher Education in Mathematical Studies

Status of the Courses

All students are normally admitted in the first instance as Honours students. Transfer to BSc in Mathematics, Statistics and Accounting is possible at any time subject to satisfying the appropriate progress regulations. Students wishing to obtain professional accreditation in Accounting should consult the Adviser of Study (Accounting) regarding their choice of optional modules. To be eligible for accreditation students will require to take an additional 20 credit module.

Mode of Study

The courses are available by full-time study.

Curriculum

First Year

All full-time students shall undertake modules amounting to 120 credits as follows:

Compulsory Modules	Level	Credits
MM101 Introduction to Calculus	1	20
MM102 Applications of Calculus	1	20
MM103 Geometry and Algebra with Applications	1	20
MM104 Statistics and Data Presentation	1	20
AG111 Accounting Technologies	1	20
Elective Module(s)		20

Students seeking professional accreditation in Accounting must additionally take the module

AG105 Introduction to Finance and Financial Statistics	1	20
--	---	----

Progress

In order to progress to the second year of the Honours course in addition to satisfying the requirements of General Academic Regulation 65 student must also gain passes in the following modules: *MM101 Introduction to Calculus*, *MM102 Applications of Calculus* and *AG111 Accounting Technologies*.

In order to progress to the second year of the Bachelors course in addition to satisfying the requirements of General Academic Regulation 65 a student must also gain a pass in the following module: *AG111 Accounting Technologies*.

Award

Certificate of Higher Education: In order to qualify for the award of a Certificate of Higher Education in Mathematical Studies General Academic Regulation 103 shall apply.

Mathematics, Statistics and Economics

BSc (with Honours) in Mathematics, Statistics and Economics Certificate/Diploma of Higher Education in Mathematical Studies

Curriculum (Full-time study)

First Year

All full-time students shall undertake modules amounting to 120 credits as follows:

Compulsory Modules	Level	Credits
MM101 Introduction to Calculus	1	20
MM102 Applications of Calculus	1	20
MM103 Geometry and Algebra with Applications	1	20
MM104 Statistics and Data Presentation	1	20
BF114 Introduction to Economics & Business Analysis	1	20
Elective Module(s)		20

Curriculum (Part-time study)

Students studying on a part-time basis will normally take modules amounting to 60 credits in each year.

Progress

In order to progress to the second year of the Honours course in addition to satisfying the requirements of General Academic Regulation 65 a student must also gain a pass in the following modules: *MM101 Introduction to Calculus*, *MM102 Applications of Calculus* and *BF114 Introduction to Economics and Business Analysis*.

In order to progress to the second year of the Bachelors course in addition to satisfying the requirements of General Academic Regulation 65 a student must also gain a pass in the following module: *BF114 Introduction to Economics and Business Analysis*.

Progress (Part-time study)

General Academic Regulations 65 and 71 shall apply.

Award

Certificate of Higher Education: In order to qualify for the award of a Certificate of Higher Education in Mathematical Studies General Academic Regulation 103 shall apply.

Mathematics, Statistics and Finance

BSc (with Honours) in Mathematics, Statistics and Finance Certificate/Diploma of Higher Education in Mathematical Studies

Mode of Study

The courses are available by full-time study only.

Curriculum

First Year

All students shall undertake modules amounting to 120 credits as follows:

Compulsory Modules	Level	Credits
MM101 Introduction to Calculus	1	20
MM102 Applications of Calculus	1	20
MM103 Geometry and Algebra with Applications	1	20
MM104 Statistics and Data Presentation	1	20
BF123 Introduction to Finance and Financial Analysis	1	20
Elective Module(s)		20

.....

Progress

In order to progress to the second year of the Honours course in addition to satisfying the requirements of General Academic Regulation 65 a student must also gain a pass in the following modules: *MM101 Introduction to Calculus*, *MM102 Applications of Calculus* and *BF123 Introduction to Finance and Financial Analysis*.

In order to progress to the second year of the Bachelors course in addition to satisfying the requirements of General Academic Regulation 65 a student must also gain a pass in the following module: *BF123 Introduction to Finance and Financial Analysis*.

.....

Award

Certificate of Higher Education: In order to qualify for the award of a Certificate of Higher Education in Mathematical Studies General Academic Regulation 103 shall apply.

Mathematics, Statistics and Business Analysis

BSc (with Honours) in Maths, Statistics and Business Analysis Certificate/Diploma of Higher Education in Mathematical Studies

Mode of Study

The courses are available by full-time study only.

Curriculum

First Year

All students shall undertake modules amounting to 120 credits as follows:

Compulsory Modules	Level	Credits
MM101 Introduction to Calculus	1	20
MM102 Applications of Calculus	1	20
MM103 Geometry and Algebra with Applications	1	20
MM104 Statistics and Data Presentation	1	20
BF114 Introduction to Economics and Business Analysis	1	20
Elective Module(s)		20

Progress

In order to progress to the second year of the Honours course in addition to satisfying the requirements of General Academic Regulation 65 a student must also gain a pass in the following modules: *MM101 Introduction to Calculus*, *MM102 Applications of Calculus* and *BF114 Introduction to Economics and Business Analysis*.

In order to progress to the second year of the Bachelors in addition to satisfying the requirements of General Academic Regulation 65 a student must also gain a pass in the following module: *BF114 Introduction to Economics and Business Analysis*.

Award

Certificate of Higher Education: In order to qualify for the award of a Certificate of Higher Education in Mathematical Studies General Academic Regulation 103 shall apply.

Data Analytics

BSc (with Honours) in Data Analytics Certificate/Diploma of Higher Education in Data Analytics

Mode of Study

The courses are available by full-time study.

Curriculum

First Year

All students shall undertake modules amounting to 120 credits as follows:

Compulsory Modules	Level	Credits
MM101 Introduction to Calculus	1	20
MM102 Applications of Calculus	1	20
MM106 Essential Statistics	1	10
MM123 Geometry and Algebra	1	10
CS103 Machines, Languages and Computation	1	20
CS104 Information and Information Systems	1	20
CS105 Programming Foundations	1	20

.....

Progress

In order to progress to the second year of the Honours course in addition to satisfying the requirements of General Academic Regulation 65 a student must also gain a pass in the following modules: *MM101 Introduction to Calculus and MM102 Applications of Calculus*.

In order to progress to the second year of the Bachelors course General Academic Regulation 65 shall apply.

.....

Award

Certificate of Higher Education: In order to qualify for the award of a Certificate of Higher Education in Data Analytics General Academic Regulation 103 shall apply.

SYLLABUS INFORMATION

Class Code: MM101	Class Title: Introduction to Calculus
Level: 1	Credits: 20
Class Coordinator: Dr D. Pritchard	Tel: 3819 Email: david.pritchard@strath.ac.uk
Teaching Staff: Dr P. Davidson & Dr D. Pritchard	
Pre-requisites: Essential SQA Higher Mathematics (Grade A) or equivalent (including confidence in algebraic manipulation, arithmetic and elementary trigonometry).	
Students: CompulsoryM, MS, MT, MSA, MSE, MSF, MSBA, MP, MCS, DA	

CLASS DELIVERY (HOURS)

LECTURES	TUTORIALS	LABORATORIES	ASSIGNMENTS	SELF STUDY	TOTAL
66	11	0	33	90	200

CLASS ASSESSMENT

Course work (20%), 2 hour degree examination (80%) in January. August resit examination (100%).

GENERAL AIMS

To study the basic concepts and standard methods of mathematical notation and proof, polynomial equations and inequalities, sequences and series, functions, limits and continuity, differentiation and integration.

LEARNING OUTCOMES

On completion of this class, the student should

- be able to understand and use correctly basic mathematical notation;
- be able to write mathematical arguments in a clear and concise way;
- understand the concept of mathematical proof by induction and other methods;
- be able to solve linear and quadratic equations and inequalities;
- be able to apply polynomial division and use the remainder theorem;
- know the factorial and binomial coefficient notation, and be able to use the binomial theorem;
- understand the concepts of a sequence and a series, and be able to do simple problems on finite and infinite summation;
- understand the concept of a function, its domain and its range;
- be able to apply all the standard rules of differentiation to find first and higher derivatives;
- be able to find integrals using substitutions and integration by parts; and
- be familiar with trigonometric functions and their inverses, exponentials, logarithms, and be able to evaluate derivatives and integrals of such functions.

RECOMMENDED TEXT/READING

Adams, R.A., *Calculus: A Complete Course*, Pearson Addison Wesley, 6th Edition. D515 ADA. ISBN: 0321270002.
 Allenby, R.B.J.T., *Numbers and Proofs*, Arnold. D512.02 ALL. ISBN: 0340676531.
 Houston, K., *How to Think Like a Mathematician: A Companion to Undergraduate Mathematics*, CUP. D510.72 HOU. ISBN: 0521719780.
 Spivak, M., *Calculus*, Cambridge University Press, 3rd edition. D515 SPI. ISBN: 0521867444.
 Stewart, J., *Calculus*, Brooks/Cole, International Metric Edition. D515.15 STE. ISBN: 9780538498845.
 Vivaldi, F. *Mathematical Writing*, Springer. D510 VIV. ISBN: 9781447165262.

Class Code: MM102	Class Title: Applications of Calculus
Level: 1	Credits: 20
Class Coordinator: Dr J. Pestana	Tel: 4559 Email: jennifer.pestana@strath.ac.uk
Teaching Staff: Dr J. Pestana & Prof. S. K. Wilson	
Pre-requisites: Essential MM101 or equivalent	
Students: Compulsory M, MS, MT, MSA, MSE, MSF, MSBA, MP, MCS, DA	

CLASS DELIVERY (HOURS)

LECTURES	TUTORIALS	LABORATORIES	ASSIGNMENTS	SELF STUDY	TOTAL
44	10	0	30	116	200

CLASS ASSESSMENT

Course work (20%), 2 hour degree examination (80%) in May/June. August resit examination (100%).

GENERAL AIMS

The fundamental concepts of calculus (differentiation and integration) presented in MM101 will be examined in more detail, extended to a larger class of functions by means of more sophisticated methods, including an introduction to complex numbers and variables, all demonstrated in application to practical problems including solving basic first and second-order differential equations.

LEARNING OUTCOMES

- On completion of this class, the student should
- be able to calculate derivatives of functions that are given implicitly or parametrically;
 - be able to compute linear and polynomial approximations of functions;
 - be able to construct Taylor polynomials;
 - be able to sketch simple curves;
 - be able to solve elementary max/min and related rate problems;
 - be able to integrate functions using various substitutions and integration by parts;
 - be able to compute the volume and surface area of bodies of revolution and the arc length of a plane curve;
 - be familiar with complex variables in both Cartesian and polar forms;
 - be able to carry out complex arithmetic operations, find roots, factorize polynomials and derive trigonometric identities;
 - be able to solve some basic first and second order differential equations; and
 - be able to identify solution properties of certain ODEs using the graph of the right-hand side function.

RECOMMENDED TEXT/READING

Adams, R.A., *Calculus: A Complete Course*, Pearson Addison Wesley, 6th Edition. D515 ADA. ISBN: 0321270002.
Spivak, M., *Calculus*, Cambridge University Press, 3rd edition. D515 SPI. ISBN: 0521867444.

Class Code: MM103	Class Title: Geometry and Algebra with Applications
Level: 1	Credits: 20
Class Coordinator: Dr R. McPike	Tel: 3372 Email: ruaraidh.mcpike@strath.ac.uk
Teaching Staff: Dr E. Dombi & Dr R. McPike	
Pre-requisites: Essential SQA Higher Mathematics (Grade B) or equivalent	
Students: Compulsory M, MS, MT, MSA, MSE, MSF, MSBA	

CLASS DELIVERY (HOURS)

LECTURES	TUTORIALS	LABORATORIES	ASSIGNMENTS	SELF STUDY	TOTAL
44	11	0	0	145	200

CLASS ASSESSMENT

Course work (20%), 2 hour degree examination (80%) in May/June. August resit examination (100%).

GENERAL AIMS

To give an introductory treatment of vectors and matrices, and to introduce the idea of mathematical modelling through their application to real-world problems.

LEARNING OUTCOMES

On completion of this class, the student should

- appreciate the interconnectedness of geometry and algebra;
- describe operations needed to transform congruent shapes into each other both algebraically and geometrically;
- use and manipulate vectors and matrices algebraically and geometrically;
- understand when matrices can be added or multiplied together;
- write any straight line in implicit, vector or (where possible) explicit form and convert between the three;
- convert between vector and Hessian forms of planes;
- solve simple problems involving straight lines and planes (e.g., intersection points, and angles) making use of distance and section formulae where appropriate;
- be familiar with the algebraic definition of conic sections to find and sketch key features;
- apply and invert affine transformations to vectors to understand their geometric effects;
- find affine transformations to map between any two given triangles;
- understand the concept of a linear transformation and appreciate that a linear transformation can be decomposed into certain basic mappings;
- generalise geometric concepts in 2D to 3D;
- understand the concept of a mathematical model and be able to interpret problems in a mathematical way, and appreciate the significance of modelling for real-world applications;
- formulate and solve problems involving difference and differential equations (for example in population modelling, heat conduction, and motion under gravity); and
- formulate and solve optimisation problems with constraints.

RECOMMENDED TEXT/READING

Anton, H., *Elementary Linear Algebra*, Wiley, 10th edition. D512.5 ANT. ISBN: 9780470458211.
Edwards, D. & Hamson, M., *Guide to Mathematical Modelling*, Palgrave Macmillan, 2nd Ed. D511.8 EDW. ISBN: 0333794X.

Class Code: MM104	Class Title: Statistics and Data Presentation
Level: 1	Credits: 20
Class Coordinator: Dr A. Miller	Tel: 2975 Email: ainsley.miller@strath.ac.uk
Teaching Staff: Dr A. Miller & Dr A. Browne	
Pre-requisites: Essential SQA Higher Mathematics (Grade B) or equivalent	
Students: Compulsory M, MS, MT, MSA, MSE, MSF, MSBA	

CLASS DELIVERY (HOURS)

LECTURES	TUTORIALS	LABORATORIES	ASSIGNMENTS	SELF STUDY	TOTAL
20	20	20	20	120	200

CLASS ASSESSMENT

Course work (100%). August resit examination (100%).

GENERAL AIMS

To present some basic ideas and techniques of statistics while introducing some essential study skills, allowing students to develop and practice personal and technical skills (e.g. self-study, teamwork, analysing data, writing reports and making presentations).

LEARNING OUTCOMES

On completion of this class, the student should

- be able to summarise and display data in an appropriate fashion;
- understand and be able to apply the laws of probability;
- be able to use sampling distributions, z- and t- tests and calculate confidence intervals using these statistics;
- be able to fit and interpret a simple linear regression model and understand correlation;
- know how to structure a statistical report;
- be able to prepare good quality reports using Word and/or LaTeX;
- be able to use Excel to make calculations using formulae, to analyse data and to produce suitable graphical and tabular representations of data;
- be confident with presenting results orally; and
- be able to work effectively as part of a team.

RECOMMENDED TEXT/READING

Clarke, G.M. & Cooke, D., *A Basic Course in Statistics*, Arnold, 5th Ed. D519.9 CLA. ISBN: 0340814063.
 Mendenhall, W., Beaver, R.J. & Beaver, B.M., *Introduction to Probability and Statistics*, Brooks/Cole.
 D 519.2 MEN. ISBN: 0495389595.
 Veitch, R., *Introduction to Statistics*, University of Strathclyde.

Class Code: MM106		Class Title: Essential Statistics	
Type: UG	PE	Level: 1	Credits: 10
Class Coordinator: Dr Ainsley Miller		Tel: 0141 548 3720 Email: ainsley.miller@strath.ac.uk	
Teaching Staff: Dr Ainsley Miller and Dr Andrew Browne			
Pre-requisites: Essential: SQA Higher Mathematics (Grade B) or equivalent			
Students: Compulsory: DA			
Overlaps: MM104, BM110			

CLASS DELIVERY (HOURS)

LECTURES	TUTORIALS	LABORATORIES	ASSIGNMENTS	SELF STUDY	TOTAL
10	10	10	0	70	100

CLASS ASSESSMENT

Course work (100%). August resit examination (100%).

GENERAL AIMS

To present some basic ideas and techniques of statistics while introducing some essential study skills (e.g. basic IT, note-taking, study skills for mathematics and statistics).

LEARNING OUTCOMES

On completion of this class, the student should

- be able to summarise and display data in an appropriate fashion;
- be able to identify different types of data;
- understand and be able to calculate basic probabilities;
- be able to use sampling distributions, z- and t- tests and calculate confidence intervals using these statistics;
- be able to carry out appropriate hypothesis tests and interpret the results in the context of the scenario
- be able to carry out one-sample chi squared tests by hand and using R;
- understand correlation and carry out calculations using R;
- be able to use the R statistical software to carry out statistical calculations.

RECOMMENDED TEXT/READING

Clarke, G.M. & Cooke, D., *A Basic Course in Statistics*, Arnold, 5th Edition. D519.9 CLA. ISBN: 0340814063.

Mendenhall, W., Beaver, R.J. & Beaver, B.M., *Introduction to Probability and Statistics*, Brooks/Cole. D 519.2 MEN. ISBN: 0495389595.

Veitch, R., *Introduction to Statistics*, University of Strathclyde.

Class Code: MM107			Class Title: Data Analysis and Presentation		
Type: UG	EO	Level: 1	Credits: 10	Semester: 2	
Class Coordinator: Dr Ainsley Miller			Tel: 0141 548 3720 Email: ainsley.miller@strath.ac.uk		
Teaching Staff: Dr Ainsley Miller and Dr Andrew Browne					
Pre-requisites: Essential: SQA Higher Mathematics (Grade B) or equivalent. Ideally MM106.					
Students:					
Overlaps: MM104					

CLASS DELIVERY (HOURS)

LECTURES	TUTORIALS	LABORATORIES	ASSIGNMENTS	SELF STUDY	TOTAL
10	10	10	20	50	100

CLASS ASSESSMENT

Course work (100%). August resit examination (100%).

GENERAL AIMS

To present some basic ideas and techniques of statistics while introducing some essential study skills, allowing students to develop and practice personal and technical skills (e.g. self study, teamwork, analysing data, writing reports and making presentations).

LEARNING OUTCOMES

On completion of this class, the student should

- know how to structure a statistical report and reference appropriately;
- be able to prepare good quality reports using Microsoft Word/ Goggle Docs or equivalent;
- be able to use statistical software, such as R, to make calculations using formulae, to analyse data and to produce suitable graphical and tabular representations of data;
- be confident with presenting results orally and producing Microsoft Powerpoint presentations;
- be able to work effectively as part of a team; and
- be able to carry out written statistical calculations on topics such as t-tests, chi squared tests, statistical process control and linear regression.

RECOMMENDED TEXT/READING

Clarke, G.M. & Cooke, D., *A Basic Course in Statistics*, Arnold, 5th Edition. D519.9 CLA. ISBN: 0340814063.

Mendenhall, W., Beaver, R.J. & Beaver, B.M., *Introduction to Probability and Statistics*, Brooks/Cole. D 519.2 MEN. ISBN: 0495389595.

Class Code: MM108	Class Title: Applying Mathematics 1
Level: 1	Credits: 10
Class Coordinator: Dr G. McKay	Tel: 3648 Email: g.mckay@strath.ac.uk
Teaching Staff: Dr G. McKay	
Pre-requisites: Essential SQA Higher Mathematics (Grade B) or equivalent	
Students: Compulsory M, MS, MT	

CLASS DELIVERY (HOURS)

LECTURES	TUTORIALS	LABORATORIES	ASSIGNMENTS	SELF STUDY	TOTAL
20	5	0	30	45	100

CLASS ASSESSMENT

Course work (20%), degree examination (80%) in December. August resit examination (100%).

GENERAL AIMS

To introduce students to some elementary number theory with interesting modern applications.

LEARNING OUTCOMES

On completion of this class, the student should

- be able to factorise integers and find highest common factors and lowest common multiples;
- be able to use the Euclidean algorithm;
- know the basic properties of congruences and be able to perform calculations using modular arithmetic;
- be familiar with the application of congruences to International Standard Book Numbers and Universal Product Codes;
- be able to solve Diophantine equations and linear equations in Z_n ; and
- understand what is meant by affine ciphers, exponential ciphers and the RSA cryptosystem.

RECOMMENDED TEXT/READING

Rosen, K. H., "Discrete Mathematics and its Applications", McGraw-Hill, 7th Edition, D511.3 ROS, ISBN-13: 978-007-131501-2.

Full syllabus: classcat.strath.ac.uk/classcatalogue/control/showclass?uiocode=138938&show=all

Class Code: MM109	Class Title: Applying Mathematics 2
Level: 1	Credits: 10
Class Coordinator: Dr D. Bevan	Tel: 4535 Email: david.bevan@strath.ac.uk
Teaching Staff: Dr D. Bevan	
Pre-requisites: Essential SQA Higher Mathematics (Grade B) or equivalent	
Students: Compulsory M, MS, MT	

CLASS DELIVERY (HOURS)

LECTURES	TUTORIALS	LABORATORIES	ASSIGNMENTS	SELF STUDY	TOTAL
20	5	0	30	45	100

CLASS ASSESSMENT

Course work (20%), degree examination (80%) in May. August resit examination (100%).

GENERAL AIMS

To introduce students to areas of mathematics not usually met in school or college courses.

LEARNING OUTCOMES

On completion of this class, the student should

- understand the mathematical concepts of graphs;
- understand how to solve mathematical problems using graphs;
- be able to construct graphs with given degree patterns;
- be able to identify Eulerian graphs and, in simple cases, Hamiltonian graphs.

RECOMMENDED TEXT/READING

Chartrand, G. and Zhang, P., *A First Course in Graph Theory*, 2012, Dover Publications. ISBN: 0486483681
Wilson, Robin J., *Introduction to Graph Theory*, 1996, Longman. ISBN: 0582249937

Full syllabus: classcat.strath.ac.uk/classcatalogue/control/showclass?uiocode=138430&show=all