MAS115: Mathematical Investigation Skills

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About the course

MAS115 is a 20-credit, year long module. During the year you will develop important skills for investigating and reporting on mathematical problems.

These skills will be useful during your degree and beyond; such *transferrable skills* are very useful in the workplace and valued by employers.

Computers can be very helpful with mathematics, so in Semester 1 you will learn the basics of the programming language *Python*.

Python is a good first language to learn and also has powerful mathematical capabilities.

To create professional-quality mathematical documents requires using the LaTeX system, which you will also do in Semester 1.

Another way of presenting results is online, and this involves making webpages using HTML, which you will also do in Semester 1.

In Semester 2 you will learn to programme in the package *R*, which is widely used in statistical modelling and analysis.

You will use all of the techniques you have learned in the investigation and presentation of three mathematical projects during the year.

Semester 1 timetable

In Semester 1 there are two streams running per week.

- Tuesday, 9am: Arts Tower Lecture Theatre 4 (Alex Fletcher on Python)
- Tuesday/Wednesday: Python lab (check tutorial groups online)
- Thursday, 10am: Hicks Lecture Theatre 1 (Sam Marsh on presentation)
- Thursday/Friday: Presentation lab (check tutorial groups online)

Alex Fletcher's lectures are in Weeks 1, 3, 5, 6 and 12 only. (Week 12 is the Python test.) All other classes happen every week.

Week 7 will be a reading week with no classes.

Assessment

The assessment for the course take place throughout the module as follows.

- Semester 1, mid-semester mini-project (10%)
- Semester 1 programming test (10%)
- Semester 2, mid-semester mini-project (10%)
- Semester 2 programming test (10%)
- Group projects (50% total)
- Weekly homeworks (10%)

You *must* participate satisfactorily in all the group projects to pass the module.

Semester 1 mini-project

The mini-project in Semester 1 will use the Python programming and LaTeX presentation skills in a small mathematical investigation. The project will be peer assessed (that is, marked by fellow MAS115 students). Part of the mark will be awarded for the assessing of other people's projects.

The mini-project will be released in Week 6 and will be due in in Week 8.

Group projects

You will spend a good proportion of this course working on group projects. (The exact dates for these projects are to be confirmed.)

- Project 1 will be released towards the end of Semester 1, and due in the January exam period.
- The remaining project(s) will be set in Semester 2.

You will work on the projects in small groups. You will be required to create webpages (using HTML and LaTeX), and make a presentation to a small number of fellow students.

Other information

- There is no end-of-year exam, so it is very important that you keep up with the work so that you pass the module first time. Failing the module could lead to you repeating Level 1.
- You *must* participate in all the group projects in order to pass the module.
- There are no books that are essential for doing this course, but there might be some background texts that your lecturers will recommend.
- The course website will be filled with materials for the course and is at `http://mas115.group.shef.ac.uk`.