

# 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 *transferable 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  $\text{\LaTeX}$  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: Alfred Denny Building Lecture Theatre 2 (Dr Willerton on Python)
- Tuesday/Wednesday: Firth Court, Diamond or Hicks Building, Python lab (check tutorial groups online)
- Thursday, 10am: Alfred Denny Building Lecture Theatre 2 (Dr Marsh on presentation)
- Thursday/Friday: Firth Court or Hicks Building, presentation lab (check tutorial groups online)

Dr Willerton's lectures are in Weeks 1, 3, 5, 8, 10, 12 only. 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%)
- 3 group projects (50% total)
- Weekly homeworks (10%)

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

## Semester 1 mini-project

The mini-project in Semester 1 will use the Python programming and  $\text{\LaTeX}$  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 in Week 12 of Semester 1 and due at the start of Semester 2.
- Projects 2 and 3 will be set in Semester 2.

You will work on the projects in small groups. You will be required to submit two of the group projects as webpages (using HTML and  $\text{\LaTeX}$ ) and give one project as a presentation.

## 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 three 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>.