Sheffield Hallam University

55-409621
Mathematical and Statisitical Methods
Module Guide

Contents

1 Introductory information

Module Name   Mathematical and Statisitical Methods

Module Code   55-409621

Semester   1

Level   4

Credits   40

Module Leader   Dr. Angharad Ugonna (a.ugonna@shu.ac.uk, 0114 225 4755, Norfolk 607)

Contact Time   Open door policy and by appointment

Assessment Model   Coursework 60% and Exam 40%.

2   What is the module about?

This module develops the skills required of a professional mathematician including reading, thinking and working with mathematical and statistical ideas, and programming. Students will develop confidence and accuracy with foundational concepts and techniques, and extend these to new topics which are essential to successful further study of mathematics.

Indicative content:

- Functions, solving equations, complex numbers;

- Calculus, Analytical and numerical techniques for solution of basic differential equations.

- Introduction to matrices and linear algebra

- Core concepts of statistics: An introduction to probability and inferential statistics

- Introduction to programming

The module leader is Angharad Ugonna. If you have any general problems regarding the module then please email a.ugonna@shu.ac.uk or go see her in Norfolk 607. Otherwise email or go and see the lecturer teaching at that time.

Mathematical Methods Angharad Ugonna (a.ugonna@shu.ac.uk.

Statisitical Methods Angharad Ugonna (a.ugonna@shu.ac.uk.

Introduction to Programming Peter Rowlett (P.Rowlett@shu.ac.uk)

Introduction to Linear Algebra Peter Rowlett (P.Rowlett@shu.ac.uk)

3   What will the module enable you to do (Learning outcomes)?

By engaging successfully with this module you will be able to

LO1 demonstrate a reasonable understanding of appropriate mathematical and statistical knowledge and a reasonable level of skill in calculation and manipulation within this body of knowledge;

LO2 comprehend problems, formulate them mathematically, obtain solutions (showing judgement in selection and application of the techniques used), and drawing valid inferences from these;

LO3 apply critical thinking and problem-solving skills to problems arising in mathematics and statistics, and in the context of other disciplines or applications;

LO4 demonstrate familiarity with at least one programming language and competence with other appropriate mathematical and statistical technology;

LO5 demonstrate digital capabilities, including retrieval of information and assessment of its veracity, and the ability to employ digital tools to support mathematical reasoning and communication;

4 What will the module cover?

The module consists of introducing revisiting key concepts learnt at A Level and expand to new areas of mathematics. We will introduce technology to solve problems including basic programming skills. The four main areas that we will be studying in this module are:

Mathematical Methods Revising and building on core concepts of 'pure' mathematics at A level. Topics include defining a function, introducing complex numbers, key concepts of differential and integral calculus, first order differential equations and their solutions and hyperbolic functions. We will also introduce software to help check your answers and find solutions to more complex problems.

Statisitical Methods Revising key concepts from statistics at A level and introducing tools required to work on industry projects in the second semester.

Introduction to Linear Algebra A fundamental area of degree mathematics is understanding how matrices work and how we can manipulate them to solve complex problems including in numerical methods and operational research. The key concepts will be introduced in this section.

Introduction to Programming Fundamental to modern mathematics is having an understanding of how to write computer programes. Here we introduce you to Python and how to use it in a mathematical context.

5 How is it taught?

Material for this module will be a mixture of online material and exercises, in class lecture notes and self directed research. There is an expectation that you come to sessions fully prepared and work on module material outside of class.

6 How is it assessed?

This module is consists of two main task. Coursework - which will be a mixture of worksheets, reflections and written reports is submitted as a final portfolio and is work 60% of the final module mark, and an exam to be sat in January which is worth 40% of the exam.

Act. No.	Name (weighting)	Submission Deadlines	Submission Point
1	Coursework - Portfolio (60%)	**3pm, 5th December**	Blackboard
2	Exam (40%)	**January 2025**	On Campus

To pass this module you need an overall mark of 40% or over. You do not need to pass every piece of work to pass overall. If you fail to obtain 40% you will be asked to do an extended piece of work in the summer, based on work covered during the year.

6.1 Deadlines and Extensions

Deadlines are set at the beginning of the year and are clearly indicated above and on MyHallam. Any changes to these will be clearly communicated in advance of the dates. If you miss this deadline then you will still be able to submit it for up to **24 hours** after the initial deadline. **However**, any late assignment may be **capped at 40%** and you may not receive feedback on the work.

If for any reason you require an extension for the overall portfolio then you will need to make apply through my student record. Extensions will only be given for extenuating circumstances and evidence may be required.

If you need extra time for a portfolio activity to be marked for feedback then please talk to the module tutor teaching that section.

7 Teaching and learning programme

Week	Hours p/w	Topic	Tutors
9-12	2	Introduction to Programming	Peter Rowlett
13-20	1		
9-12	2	Mathematical Methods	Angharad Ugonna
13-20	3		
9-14	2	Introduction to Linear Algebra	Peter Rowlett
15-20	2	Statisitical Methods	Angharad Ugonna

7.1 Tutorials/ Lectures

6 hours weekly sessions - please see `mytimetable.shu.ac.uk` for most up to date timetable. The timetable may vary from one week to the next so please check every week.

- These sessions should be attended by all students taking the module.

- Key learning materials are supplied online and in some instances, hard copies will be available from Norfolk 6 for collection.

- The purpose of these sessions is to explain and develop key concepts and development of a deeper understanding of the topics covered.

7.2 Self-directed time

- In addition to the above timetabled content, on average you should anticipate spending a further 12 hours per week engaged in study related to the module.

- This can cover a range of areas such as background reading of key texts, re-working problems, reviewing blackboard resources, preparation for the next taught sessions and preparing assignments.

7.3 Office Hours

We do not have set office hours but if you have a problem or wish to discuss any aspect of the module then please email the appropriate tutor.

We will be happy to answer any question relating to our respective sections.

8   Blackboard (MyHallam)

All learning material will be available on blackboard unless stated otherwise when you will be guided to the appropriate place through blackboard. Assignments are to be submitted via Blackboard in the usual way, unless you are informed otherwise.