Sheffield Hallam University

55-402842: Proof and Reasoning Module Guide

Contents

1 Introductory information

Module Name Proof and Reasoning

Module Code 55-402842

Semester 1

Level 4

Credits 20

Module Leader Peter Rowlett (p.rowlett@shu.ac.uk, 0114 225 5838, Norfolk 601)

Contact Time 48 hours combined lectures and tutorials

Assessment Model 100% Coursework

2 What is the module about?

This module is fundamentally about mathematical thinking – first how to solve problems, and later proving that our mathematical arguments are correct. Along the way, we will develop various other underpinning mathematical topics that you will use throughout your degree.

The module leader is Peter Rowlett and he teaches the whole module. If you have any general problems regarding the module then please email p.rowlett@shu.ac.uk or go see him in Norfolk 601, or see him in class.

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

By engaging successfully with this module you will be able to

- Develop, sustain and evaluate logical arguments and analysis, identifying assumptions made and conclusions drawn and, where appropriate, acknowledging the degree of uncertainty associated with conclusions;
- Communicate logical arguments, analysis, evidence and conclusions accurately and clearly visually, in writing and orally to specialist and non- specialist audiences;
- Begin to think critically and apply problem-solving skills to problems arising in mathematics & statistics, and in the context of other disciplines or applications.
- Work effectively, and with reflective self-knowledge and increasing independence and knowledge of inter-personal dynamics, both as an individual and as a member of a team.

4 What will the module cover?

- Mathematical skills: Problem-solving strategies; Communicate solution methods with clear definitions and justifications; Connect and apply prior learning and skills to new problems; Proof methods.
- Mathematical topics, such as: Set theory; Logic; Number bases; Modular arithmetic; Group theory; Graph theory; Combinatorics.

5 How is it taught?

Much of the learning in this module is not driven by particular content, but arises from coming to class and engaging with peers in learning activities. Where possible, notes will be provided on mathematical content covered, but no amount of reading can replace the experience of being in the room grappling with a problem.

5.1 Tutorials/ Lectures

There are two classes each week. These are two-hour sessions which are a mixture of lecture and tutorial, with a large focus on student activity. These sessions should be attended by all students taking the module.

5.2 Self-directed time

- In addition to the above timetabled content, on average you should spend time each week engaged in study related to the module.
- This might be continuing to work on problems attempted in class, background reading on the topics of the module, reviewing Blackboard resources, preparation for the next taught sessions and preparing assignments.
- You should practice your problem solving skills where possible by attempting unseen problems. There are many sources of puzzles and problems, including in books in the library.

6 How is it assessed?

This module is **100% coursework**. There are two assessments during the module.

1. The mathematical thinking skills will be demonstrated by a poster and interview completed in small groups, for **30%** of the available marks.
    - The poster deadline is **3pm on Thursday 14th November**.
    - Interviews will take place during class time on **Tuesday 19th November**.
2. The mathematical topics will be assessed via a maths assignment at the end of the module for **70%** of the available marks. The deadline for this is **3pm on Thursday 9th January 2025**.

To pass this module you need an overall mark of 40% or above. 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.

Deadlines and Extensions

Deadlines are set out above. Any changes to these will be clearly communicated in advance of the dates.

If for there is a good reason your group needs an extension with the poster, please talk Peter (p.rowlett@shu.ac.uk).

If you need an extension for the final assignment, you can request this via My Student Record.

7 Contacting staff

You can email Peter (p.rowlett@shu.ac.uk), talk to him in class or pop by his office Norfolk 601 and see if he is in. An indication of his expected movements is given on his availability calendar, but please send an email first if you want to be sure of a meeting.

8 Blackboard (MyHallam)

All learning material will be available via Blackboard. Assignments are to be submitted via Blackboard.