CS1D3-15 Mathematics for Computer Science 1 (DA)

21/22

Department
Computer Science
Level
Undergraduate Level 1
Module leader
Adam Chester
Credit value
15
Module duration
5 weeks
Assessment
30% coursework, 70% exam
Study location
University of Warwick main campus, Coventry

Description

Introductory description

This module will primarily help students to understand and be able to use basic mathematical terminology, which they will then use to understand the format and importance of formal definitions of proofs. In addition, they will cover the basics of the axiomatic method, logic, sets, relations, and functions, as well as some of the fundamental theorems in these areas, which they will then make use of to solve related problems.

Module aims

The module aims to provide students with sufficient mathematical knowledge to enable them to understand the foundations of their subject in order to support their academic studies and for applications in the workplace.

It seeks to bridge the gap between A level (or equivalent foundation) and university mathematics and to introduce students to the language and methods of professional mathematics.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

The module will comprise of 6 topics, namely:

- The role of mathematics in theoretical computer science
- The axiomatic method, including: basic concepts (axioms, definitions, theorems, proofs), finite and infinite sets, and number systems, natural numbers, and induction
- Logic, including: formal reasoning, propositions, truth values, Boolean operators, laws of propositional logic, predicates and quantifiers, and the laws of predicate logic
- Sets, including: sets and predicates, operations on sets, and the laws of set operations
- Relations, including: composition and inverse, properties, and equivalence relations
- Functions, including: the properties of functions, equinumerous sets, and countable and uncountable sets

Learning outcomes

By the end of the module, students should be able to:

- Understand the importance of mathematics in Computer Science and the role of discrete mathematics in the theory underpinning the discipline.
- Understand and use basic mathematical terminology.
- Understand the role of formal definitions and proof and be able to apply them in problem solving.
- Understand and apply basic concepts of finite and infinite sets, number systems, natural numbers, and induction.
- Understand and apply the basics of propositional and predicate logic.
- Understand and apply the basics of elementary set theory.
- Understand and apply the basics of mathematical relations and functions.

Indicative reading list

Ross and Wright, "Discrete Mathematics (5/e)", Printice Hall (2003)
Rosen, "Discrete Mathematics and its Applications (5/e)", McGraw Hill (2003)
Truss, "Discrete Mathematics for Computer Scientists (2/e)", Addison Wesley (1999)

Subject specific skills

- Able to manage data effectively and undertake data analysis
- Applies analytical and critical thinking skills to Technology Solutions development and to systematically analyse and apply structured problem solving techniques to complex systems and situations

Transferable skills

- Have demonstrated that they have mastered basic business disciplines, ethics and courtesies, demonstrating timeliness and focus when faced with distractions and the ability to complete tasks to a deadline with high quality.

- Flexible attitude
- Ability to perform under pressure
- A thorough approach to work
- Logical thinking and creative approach to problem solving

Study

Study time

Type	Required
Lectures	15 sessions of 1 hour (10%)
Seminars	15 sessions of 1 hour 30 minutes (15%)
Tutorials	14 sessions of 1 hour (9%)
Other activity	98 hours 30 minutes (65%)
Total	150 hours

Private study description

No private study requirements defined for this module.

Other activity description

Self-study practice and revision

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group D1

	Weighting	Study time
In-block problem sheets	10%	
Post-block problem sheets	20%	
Mathematics for Computer Science 1	70%	

Feedback on assessment

Written

Past exam papers for CS1D3

Availability

Courses

Course availability information is based on the current academic year, so it may change.
This module is Core for:

- Year 1 of DCSA-I1I2 Undergraduate Computer Science and Technology Solutions (Data Analyst) (Degree Apprenticeship)