

CS130-15 Sets and Proofs

25/26

Department

Computer Science

Level

Undergraduate Level 1

Module leader

Marcin Jurdzinski

Credit value

15

Module duration

10 weeks

Assessment

Multiple

Study location

University of Warwick main campus, Coventry

Description

Introductory description

This module introduces some of the fundamental mathematical ideas that are used in the design and analysis of computer systems and software.

The module makes you familiar with basic concepts and notation, helps you to develop a good understanding of mathematical proofs, and enables you to apply mathematics to solving computer science problems.

The focus in CS130 is on discrete (i.e. not continuous) mathematics.

Module aims

The module aims to provide students with sufficient mathematical knowledge to enable them to understand the foundations of their subject for both study purposes and later career development. It seeks to bridge the gap in style and content between A-level 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 axiomatic method. Basic concepts, axioms, definitions, theorems. Finite and infinite sets. Natural numbers, induction.
- Logic. Statements, truth values, Boolean operators, laws of propositional logic. Predicates, quantifiers, laws of predicate logic.
- Sets. Connection between sets and predicates. Operations on sets. Laws of set operations.
- Relations. Relation composition and inverse. Properties of relations. Equivalence relations, equivalence classes, quotient sets. Partial orders..
- Functions. Properties of functions. Equinumerous sets. Countable and uncountable sets.
- Graphs. Graph isomorphism. Graph connectivity. Eulerian and Hamiltonian graphs.
- Mathematical induction.

Learning outcomes

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

- Understand and use basic mathematical terminology.
- Understand the role of formal definitions and proofs and be able to apply them in problem solving.
- Understand the basics of propositional and predicate logic.
- Understand the basics of elementary set theory.
- Understand the basics of mathematical relations and functions.
- Understand the basics of graph theory.

Indicative reading list

Please see Talis Aspire link for most up to date list.

[View reading list on Talis Aspire](#)

Subject specific skills

Problem Solving

Understanding Abstract Concepts

Transferable skills

Critical Thinking

Creativity

Study

Study time

Type	Required
Lectures	30 sessions of 1 hour (20%)
Seminars	9 sessions of 1 hour (6%)
Private study	111 hours (74%)
Total	150 hours

Private study description

Background study
Problems solving

Costs

No further costs have been identified for this module.

Assessment

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

Students can register for this module without taking any assessment.

Assessment group D4

	Weighting	Study time	Eligible for self-certification
Problem Set 0	1%		Yes (waive)
Formative problem sheet (mock) for flat credit. This assessment is eligible for self-certification (waive).			
Problem Set 1	3%		Yes (waive)
Summative problem sheet for flat credit (1% for submission, 2% for submission of peer feedback). This assessment is eligible for self-certification (waive).			
Problem Set 2	3%		Yes (waive)
Summative problem sheet for flat credit (1% for submission, 2% for submission of peer feedback). This assessment is eligible for self-certification (waive).			
Problem Set 3	3%		Yes (waive)
Summative problem sheet for flat credit (1% for submission, 2% for submission of peer feedback). This assessment is eligible for self-certification (waive).			
Problem Set 4	10%		Yes (extension)
Summative problem sheet. This assessment is eligible for self-certification (extension).			
In-person Examination	80%		No

	Weighting	Study time	Eligible for self-certification
CS130 exam			

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- Answerbook Pink (12 page)

Assessment group R3

	Weighting	Study time	Eligible for self-certification
In-person Examination - Resit	100%		No
CS130 resit exam			

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- Answerbook Gold (24 page)

Feedback on assessment

There will be 3 formative small problem sheets, and feedback on problem sheets will be given in seminar sessions.

[Past exam papers for CS130](#)

Availability

Courses

This module is Core for:

- UCSA-G500 Undergraduate Computer Science
 - Year 1 of G500 Computer Science
 - Year 1 of G500 Computer Science
 - Year 1 of G500 Computer Science
- UCSA-G503 Undergraduate Computer Science MEng
 - Year 1 of G500 Computer Science
 - Year 1 of G503 Computer Science MEng
 - Year 1 of G503 Computer Science MEng
- Year 1 of UCSA-I1N1 Undergraduate Computer Science with Business Studies

This module is Optional for:

- Year 1 of UCSA-G406 Undergraduate Computer Systems Engineering
- Year 1 of UCSA-G408 Undergraduate Computer Systems Engineering