

CS262-15 Logic and Verification

23/24

Department

Computer Science

Level

Undergraduate Level 2

Module leader

Torsten Mutze

Credit value

15

Module duration

10 weeks

Assessment

Multiple

Study location

University of Warwick main campus, Coventry

Description

Introductory description

To give students an understanding of the basics of mathematical logic, and its applications to specifying and verifying computing systems.

This module is only available to students in the second year of their degree and is not available as an unusual option to students in other years of study.

Module aims

To give students an understanding of the basics of mathematical logic, and its applications to specifying and verifying computing systems. Algorithms and proof calculi for verification, as well as associated tools, will be studied. Theory and practice relating to reliability of systems form a vital part of computer science.

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.

- Propositional logic: proofs, semantics, normal forms, SAT solvers.
- Predicate logic: proofs, semantics.
- Specifying and modelling software.

- Verification by model checking.
- Proof calculi for program verification.

Learning outcomes

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

- Construct and reason about proofs in a variety of logics.
- Understand and compare the semantics of a variety of logics.
- Apply logic to specify and verify computing systems.
- Understand basic algorithms for formal verification.
- Use formal verification tools.

Indicative reading list

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

[View reading list on Talis Aspire](#)

Subject specific skills

- Formal reasoning about computer systems, languages and proofs
- Using software systems for formal verification and logic programming

Transferable skills

- Capturing statements in natural language as formal mathematical statements
- Understand the limits of computation/proofs

Study

Study time

Type	Required
Lectures	30 sessions of 1 hour (20%)
Seminars	7 sessions of 1 hour (5%)
Practical classes	3 sessions of 1 hour (2%)
Private study	110 hours (73%)
Total	150 hours

Private study description

- background reading

- work on exercise sheets
- programming experiments

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
Class test 50 minute class test	10%	
Practical Coursework In-person Examination CS262 exam	15% 75%	

- Answerbook Pink (12 page)

Assessment group R3

	Weighting	Study time
In-person Examination - Resit CS262 resit exam	100%	

- Answerbook Pink (12 page)

Feedback on assessment

Written feedback on coursework.

Verbal feedback in seminars.

[Past exam papers for CS262](#)

Availability

Courses

This module is Core for:

- UCSA-G500 Undergraduate Computer Science
 - Year 2 of G500 Computer Science
 - Year 2 of G500 Computer Science
- UCSA-G503 Undergraduate Computer Science MEng
 - Year 2 of G503 Computer Science MEng
 - Year 2 of G503 Computer Science MEng
- Year 2 of UCSA-I1N1 Undergraduate Computer Science with Business Studies

This module is Option list A for:

- UCSA-G4G1 Undergraduate Discrete Mathematics
 - Year 2 of G4G1 Discrete Mathematics
 - Year 2 of G4G1 Discrete Mathematics
- Year 2 of UCSA-G4G3 Undergraduate Discrete Mathematics

This module is Option list B for:

- Year 2 of UMAA-G105 Undergraduate Master of Mathematics (with Intercalated Year)
- Year 2 of USTA-G300 Undergraduate Master of Mathematics, Operational Research, Statistics and Economics
- UMAA-G100 Undergraduate Mathematics (BSc)
 - Year 2 of G100 Mathematics
 - Year 2 of G100 Mathematics
 - Year 2 of G100 Mathematics
- UMAA-G103 Undergraduate Mathematics (MMath)
 - Year 2 of G100 Mathematics
 - Year 2 of G103 Mathematics (MMath)
 - Year 2 of G103 Mathematics (MMath)
- Year 2 of UMAA-G106 Undergraduate Mathematics (MMath) with Study in Europe
- Year 2 of UMAA-G1NC Undergraduate Mathematics and Business Studies
- Year 2 of UMAA-G1N2 Undergraduate Mathematics and Business Studies (with Intercalated Year)
- Year 2 of UMAA-GL11 Undergraduate Mathematics and Economics
- Year 2 of UECA-GL12 Undergraduate Mathematics and Economics (with Intercalated Year)
- Year 2 of UMAA-G101 Undergraduate Mathematics with Intercalated Year