

# CS262-15 Logic and Verification

**20/21**

**Academic year**

20/21

**Department**

Computer Science

**Level**

Undergraduate Level 2

**Module leader**

Torsten Mutze

**Credit value**

15

**Module duration**

10 weeks

**Assessment**

25% coursework, 75% exam

**Study location**

University of Warwick main campus, Coventry

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## 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.

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## 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 D2

	Weighting	Study time
Class test	10%	
45 minute class test		
Practical Coursework	15%	
CS262 exam	75%	
Resit is 100% examined		

### Feedback on assessment

Written feedback on coursework.

Verbal feedback in seminars.

[Past exam papers for CS262](#)

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## Availability

### Courses

This module is Core for:

- Year 2 of UCSA-G500 Undergraduate Computer Science
- Year 2 of UCSA-G503 Undergraduate Computer Science MEng
- Year 2 of UCSA-I1N1 Undergraduate Computer Science with Business Studies
- Year 2 of UCSA-G5N1 Undergraduate Computer and Management Sciences

This module is Optional for:

- Year 2 of USTA-G1G3 Undergraduate Mathematics and Statistics (BSc MMathStat)
- Year 2 of USTA-GG14 Undergraduate Mathematics and Statistics (BSc)

This module is Core option list A for:

- Year 2 of UCSA-G5N1 Undergraduate Computer and Management Sciences

This module is Option list A for:

- Year 2 of UCSA-G400 BSc Computing Systems
- Year 2 of UCSA-G402 MEng Computing Systems
- Year 2 of UCSA-G4G3 Undergraduate Discrete Mathematics

This module is Option list B for:

- Year 2 of UCSA-G4G1 Undergraduate Discrete Mathematics
- Year 2 of UCSA-G4G3 Undergraduate Discrete Mathematics
- 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
- Year 2 of UMAA-G100 Undergraduate Mathematics (BSc)
- Year 2 of UMAA-G103 Undergraduate 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
- Year 2 of USTA-Y602 Undergraduate Mathematics,Operational Research,Statistics and Economics