CS147-10 Discrete Mathematics and Its Applications 2

24/25

Department
> Computer Science

Level
> Undergraduate Level 1

Module leader
> Sayan Bhattacharya

Credit value
> 10

Module duration
> 10 weeks

Assessment
> Multiple

Study location
> University of Warwick main campus, Coventry

Description

Introductory description

This module is designed to introduce students to language and methods of the area of Discrete Mathematics.

Module aims

The focus of the module is on basic mathematical concepts in discrete maths and on applications of discrete mathematics in algorithms and data structures. One of the aims will be to show students how discrete mathematics can be used in modem computer science (with the focus on algorithmic applications).

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.

Big-Oh notation and its use in the analysis of algorithms.
Basic concepts from graph theory; such as trees, matchings, euler tours, colorings and cuts.

Applications of discrete probability; such as probabilistic method, random walks and entropy.

Learning outcomes

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

- Understand the notion of mathematical thinking, mathematical proofs, and algorithmic thinking, and be able to apply them in problem solving.
- Understand asymptotic notation, its significance, and be able to use it to analyse the runtimes of algorithms.
- Understand some basic properties of graphs and discrete probability, and be able to apply the methods from these subjects in problem solving.

Indicative reading list

To be finalised.

Subject specific skills

Basic knowledge of graph theory and its applications in algorithms
Basic knowledge of discrete probability and its applications in algorithms
Understanding and using asymptotic notations in design and analysis of algorithms

Transferable skills

Communication - Reading and writing mathematical proofs
Critical thinking - problem solving

Study

Study time

Type	Required
Lectures	30 sessions of 1 hour (30%)
Seminars	9 sessions of 1 hour (9%)
Private study	31 hours (31%)
Assessment	30 hours (30%)
Total	100 hours

Private study description

Revision of lectures
Going through the problems solved during seminar sessions

Solving past exam papers

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 D1

	Weighting	Study time	Eligible for self-certification
Coursework 1	10%	5 hours	Yes (extension)
Homework exercise consisting of several problems.			
Coursework 2	10%	5 hours	Yes (extension)
Homework exercise consisting of several problems.			
In-person Examination	80%	20 hours	No
CS147 final exam (Summer)			

- Answerbook Pink (12 page)

Assessment group R1

	Weighting	Study time	Eligible for self-certification
In-person Examination - Resit	100%		No
CS147 resit exam (September)			

- Answerbook Pink (12 page)

Feedback on assessment

Marked coursework scripts available on students' request

Past exam papers for CS147

Availability

Courses

This module is Core for:

- Year 1 of UCSA-G4G1 Undergraduate Discrete Mathematics
- Year 1 of UCSA-G4G3 Undergraduate Discrete Mathematics

This module is Option list B for:

- Year 1 of UMAA-G105 Undergraduate Master of Mathematics (with Intercalated Year)
- Year 1 of UMAA-G100 Undergraduate Mathematics (BSc)
- UMAA-G103 Undergraduate Mathematics (MMath)
  - Year 1 of G100 Mathematics
  - Year 1 of G103 Mathematics (MMath)
- Year 1 of UMAA-G106 Undergraduate Mathematics (MMath) with Study in Europe
- Year 1 of UMAA-G1NC Undergraduate Mathematics and Business Studies
- Year 1 of UMAA-G1N2 Undergraduate Mathematics and Business Studies (with Intercalated Year)
- Year 1 of UMAA-GL11 Undergraduate Mathematics and Economics
- Year 1 of UECA-GL12 Undergraduate Mathematics and Economics (with Intercalated Year)
- Year 1 of UMAA-G101 Undergraduate Mathematics with Intercalated Year