Accessibility statement

Theory 1 - COM00013C

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- **Department**: Computer Science
- **Module co-ordinator**: Dr. Nick Pears
- **Credit value**: 20 credits
- **Credit level**: C
- **Academic year of delivery**: 2020-21
  - See module specification for other years: 2019-20

Module summary

Mathematical Foundations of Computer Science

Module will run

Occurrence	Teaching cycle
A	Autumn Term 2020-21

Module aims

Students will be introduced to the key discrete mathematics concepts that are the foundation of computer science. Students will be introduced to propositional and predicate logic, set theory, combinatorics, functions and relations and graph theory. Students will be introduced to the mathematical foundations, and will be able to identify the application of these concepts in real-world examples. Students will be introduced to a variety of proof techniques that will be used throughout their degree programme.

Module learning outcomes

T101	Define, read and apply mathematical notations for purposes of describing mathematical concepts from across discrete mathematics including: propositional and predicate logic, set theory, combinatorics, functions and relations, and graph theory.
T102	Formulate definitions and examples of concepts across discrete mathematics
T103	Apply a variety of techniques to identify whether logical expressions are true or false, valid or invalid or equivalent to one another.
T104	Select appropriate techniques to prove properties about discrete mathematics concepts.
T105	Construct counterexamples to refute claims about discrete mathematics concepts.
T106	Select and construct appropriate proof techniques to prove a variety of different types of problems in discrete mathematics.
T107	Describe and use the basic concepts of discrete probability to describe events.
T108	Apply logical statements to describe real-world logical problems in relation to computer science
T109	Identify and provide examples of real-world application of sets to computer science problems

T110	Describe and apply a variety of concepts and techniques about functions and relations as they apply to computer science.
T111	Formally define and illustrate by example graphs of different graph classes, their properties and special cases of: undirected, directed, cyclic, edge labelled, weighted, directed acyclic and disconnected graphs.
T112	Model a variety of real-world problems in computer science using appropriate forms of graphs and trees,

Assessment

Task	Length	% of module mark
24 hour open exam Theory 1 (THE1)	N/A	100

Special assessment rules

None

Reassessment

Task	Length	% of module mark
24 hour open exam Theory 1 (THE1)	N/A	100

Module feedback

Feedback is provided through work in practical sessions, and after the final assessment as per normal University guidelines.

Indicative reading

** Dean N., *The Essence of Discrete Mathematics*, Prentice Hall, 1997

** Haggarty R., *Discrete Mathematics for Computing*, Addison Wesley, 2002

** Truss J., *Discrete Mathematics for Computer Scientists*, Addison Wesley, 1999

** Cohen D.I.A., *An Introduction to Computer Theory (2nd ed.)*, Wiley, 1997

** Linz P., *An Introduction to Formal Languages and Automata (4th ed.)*, Jones and Bartless, 2006

* Rodger S.H. and Finley T.W., *JFLAP: An Interactive Formal Language and Automata Package*, Jones and Bartless, 2006

* Solow D., *How to Read and Do Proofs*, Wiley, 2005

Coronavirus (COVID-19): changes to courses

The 2020/21 academic year will start in September. We aim to deliver as much face-to-face teaching as we can, supported by high quality online alternatives where we must.

Find details of the measures we're planning to protect our community.

Course changes for new students