Discrete mathematics, **logic** and reasoning (COMP40018)

Dalal Alrajeh

Many thanks to Ian Hodkinson and Robert Craven for some of the original material, and none of the errors.

Course content

The logic part of the module covers the following topics:

1. Propositional logic:
   - Syntax (language) and semantics (meaning)
   - English correspondence (translation into and out of logic)
   - Arguments and validity
   - Checking validity
     * truth tables
     * direct argument
     * equivalences
     * proof systems: natural deduction

Course content ctd.

2. Classical first-order (predicate) logic:
   - Syntax and semantics
   - English correspondence
   - Function symbols and sorts
   - Many-sorted logic
   - Checking validity
     * direct argument
     * equivalences
     * proof systems: natural deduction

Material for the above will taught across two terms:

PMT, tutorials and coursework

Tutorial sheets will be released weekly on Tuesdays and covered in the tutorial and PMT sessions.

There will be *feedback e-submissions* for questions marked as ***PMT*** in the tutorial sheet:

- The deadline for submission will be the following Monday.
- Marked, but don't contribute to final assessment grades.

There will be *One coursework e-submissions in the Autumn term*:

- Released on Mon. 20 Nov.
- The deadline for submission will be Thurs. 30 Nov.

There will be an exam in April/May: A two-part logic question.

Course material

Slides and exercises will be made available on *Scientia* (`https://scientia.doc.ic.ac.uk/signin`)

You are also advised to try the Pandora for Natural Deduction (http://www.doc.ic.ac.uk/pandora/newpandora/).

- Tool is available at `http://www.doc.ic.ac.uk/pandora/newpandora/`
- For instructions on using Pandora visit: `https://www.doc.ic.ac.uk/~da04/teaching/logic40018/pandora.html`

Reading list

The Logic Manual.
Volker Halbach. Oxford University Press, Oxford, United Kingdom. 2010.

Logic in Computer Science: Modelling and Reasoning about Systems.
Michael Huth and Mark Ryan. Cambridge University Press, New York, NY, USA. 2004.

A Mathematical Introduction to Logic.
Herbert Enderton. 2nd ed. New York: Academic Press. 2001.

Contact details

Please post your questions on Ed to be answered by others, GTAs or myself.

... and

you may reach me by email at dalal.alrajeh@ic.ac.uk.