Graphical Models (COMP0080)

**Description**

**Aims:**
To give an introduction to probabilistic modelling covering the broad theoretical landscape. The course aims to cover much of the first 12 chapters of the course textbook [www.cs.ucl.ac.uk/staff/d.barber/brml/](http://www.cs.ucl.ac.uk/staff/d.barber/brml/) The emphasis is on probabilistic modelling of discrete variables.

**Learning outcomes:**
On successful completion of the module, a student will be able to construct probabilistic models, learn parameters and perform inference. This forms the foundation of many models in the wider sciences and students should be able to develop novel models for applications in a variety of related areas.

**Content:**
- Bayesian Reasoning;
- Bayesian Networks;
- Directed and Undirected Graphical Models;
- Inference in Singly-Connected Graphs;
- Hidden Markov Models;
- Junction Tree Algorithm;
- Decision Making under uncertainty;
- Markov Decision Processes;
- Learning with Missing Data;
- Approximate Inference using Sampling;
- If time permits we will also cover some deterministic approximate inference;

**Requisites:**
In order to be eligible to select this module, a student must be registered on a programme for which it is a formally-approved option or elective choice AND must have (i) understanding and abilities with Linear Algebra, Multivariate Calculus and Probability at mathematics FHEQ Level 4; and (ii) familiarity with coding a high-level language in order to complete assessments (strongly recommend that students are skilled in Python) (some tools in Matlab and Julia are provided).

**Key information**

- **Year**: 2019/20
- **Credit value**: 15 (150 study hours)
- **Delivery**: PGT L7, Campus-based
- **Reading List**: [View on UCL website](http://www.cs.ucl.ac.uk/staff/d.barber/brml/)
- **Tutor**: Dr Dmitry Adamskiy
- **Term**: Term 1
- **Timetable**: [View on UCL website](http://www.cs.ucl.ac.uk/staff/d.barber/brml/)

**Assessment**

- Written examination (main exam period): 70%
- Coursework: 10%
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**Find out more**

For more information about the department, programmes, relevant open days and to browse other modules, visit [ucl.ac.uk](http://www.cs.ucl.ac.uk/staff/d.barber/brml/)
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