

MODULE SPECIFICATION • ELECTIVE

# Discrete Choice Models

The course covers the estimation and usage of discrete choice models that are increasingly estimated using simulation methods. Discrete choice models are used to examine the choices of individual consumers, households, firms and other agents. The course covers the main discrete choice models and a variety of specifications that build on these models, as well as standard maximum likelihood and simulation-based estimation techniques. Discrete choice models are applicable in many fields, including energy, environmental studies, health, labour, marketing, urban economics and transportation.

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|----------------------|-----------------------------|-----------------------------|----------------------------|
| <b>10</b><br>CREDITS | <b>15h</b><br>CONTACT HOURS | <b>85h</b><br>PRIVATE STUDY | <b>100h</b><br>TOTAL STUDY |
|----------------------|-----------------------------|-----------------------------|----------------------------|

COURSE CONVENOR

|        |                                                            |
|--------|------------------------------------------------------------|
| NAME   | Dr Anthony Murphy                                          |
| OFFICE | By appointment — please email to arrange a convenient time |

COURSE STRUCTURE

|                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                 |
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| Econ 7909 is a 10-credit course and students are expected to input approximately 100 hours of study. The total number of contact hours is 15 hours, leaving 85 hours for private study. Delivery is by lectures — 15 hours across the first three weeks of term, comprising 10 hours of lectures and 5 hours of tutorials. Optional clinics run on the last day of the course. | During private study, balance the course material (the primary source) against the recommended textbooks: think critically about how these fit into the body of knowledge, perform the exercises, complete coursework and revise. You can expect to perform well only by working consistently through the year. |
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## MODULE PROGRAMME

| LECT. | TOPIC                                              | SESSION CONTENT                                                                                                                                                                                                                    |
|-------|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01    | Properties and conditional logit                   | <ul style="list-style-type: none"> <li>Properties of discrete choice models (Train, chapter 2)</li> <li>Conditional logit models (chapter 3)</li> <li>Estimation (chapter 8)</li> </ul>                                            |
| 02    | Generalized extreme value, nested logit and probit | <ul style="list-style-type: none"> <li>Generalized extreme value</li> <li>Nested logit models (chapter 4)</li> <li>Probit models (chapter 5)</li> </ul>                                                                            |
| 03    | Simulation methods                                 | <ul style="list-style-type: none"> <li>Drawing from densities (chapter 9)</li> <li>Simulation assisted estimation (chapter 10)</li> </ul>                                                                                          |
| 04    | Mixed logit and individual-level parameters        | <ul style="list-style-type: none"> <li>Mixed logit models (chapter 6)</li> <li>Individual-level parameters (chapter 11)</li> <li>EM algorithm (chapter 14)</li> </ul>                                                              |
| 05    | Other issues                                       | <ul style="list-style-type: none"> <li>Stated vs revealed preferences</li> <li>Ranked data, ordered responses</li> <li>Contingent valuation</li> <li>Dynamic optimization (chapter 7)</li> <li>Endogeneity (chapter 13)</li> </ul> |

## KEY SKILLS

By the end of this course, students should have some knowledge and understanding of:

- Non-linear binary models
- Logit models and estimation
- Probit models and estimation

## ASSESSMENT

|            |                                                                                                   |
|------------|---------------------------------------------------------------------------------------------------|
| WEIGHTING  | 100% coursework                                                                                   |
| ISSUED     | End of week 6                                                                                     |
| DUE        | End of week 10 — four weeks for completion                                                        |
| SUBMISSION | Electronically via the Moodle site for this course                                                |
| FEEDBACK   | Returned within 4 weeks of the deadline, as marker's notes appended to the PDF of your coursework |

Marking criteria and penalties are set out in the Economics Undergraduate Handbook and the general course information paper, available via the Current Student page of the university website under Academic Regulations.

## COURSE TEXT & RECOMMENDED READING

Copies of the lecture slides are made available on the course web pages, together with additional material and course announcements. Additional readings are provided in advance of the lectures.

- Train, K. E. (2009). Discrete Choice Models with Simulation, 2nd edition. Cambridge University Press
- Hensher, D. A., Rose, J. M. and Greene, W. H. (2015). Applied Choice Analysis, 2nd edition. Cambridge University Press