

**Lectures:** Tuesday 9:30 AM – 12:20 PM, NREF 2-122

**Instructor:** Amy Kim, ICE 6-269, 780 492 9203, amy.kim@ualberta.ca

**Office Hours:** Tuesday 12:30-2:00 pm, Thursday 9:30–10:30 AM, or by appointment (email)

**Objective:** Provide an introduction to basic systems analysis concepts for managing transportation demand. We will focus on supply-side concepts as well as techniques for modelling travel behaviour and demand. We cover: microeconomic principles of consumer behaviour and engineering production; utility theory, disaggregate choice and market demand models; transportation network analysis and equilibrium. The examples in class and in assignments will focus on applications of lecture materials to various transportation problems.

**Class website:** On eClass: <https://eclass.srv.ualberta.ca/>

Access is password protected and available only to those enrolled. Assignments, solutions, lecture slides/notes, and other relevant information will be posted.

**Requirements:** 5 assignments 50%  
Final exam 40%  
Participation 10%

**Assignments:** Assignments will be posted on the class website. They will be due in class, in hard copy, on the date indicated on the assignment sheet (unless otherwise agreed upon). Please complete all five assignments. Late or incomplete assignments will receive a zero.

**Final Exam:** Details about the final exam will be discussed closer to the exam date (December 6).

**Reading List:** Select readings will be taken from the following sources. Other references will be provided throughout the class. First three references are on reserve at Cameron & Rutherford; the last three are available online. Older editions are usually available too.

N Nicholson, Walter: *Microeconomic Theory: Basic Principles and Extensions*, 11<sup>th</sup> Ed., South-Western, 2012. (On reserve)

PR Pindyck, R. & Rubinfeld, D.: *Microeconomics*, 5<sup>th</sup> Ed., Prentice Hall, 2001. (On reserve)

W Washington, Karlaftis & Mannering: *Statistical and Econometric Methods for Transportation Data Analysis*, 2<sup>nd</sup> Ed., CRC Press, 2011. (On reserve)

DN DeNeufville, Richard: *Applied Systems Analysis*, McGraw-Hill, 1990.

[http://ardent.mit.edu/real\\_options/ASA\\_Text](http://ardent.mit.edu/real_options/ASA_Text)

KB Koppelman, Frank S. & Bhat, Chandra: *A Self Instructing Course in Mode Choice Modeling: Multinomial and Nested Logit Models*, 2006.

[http://www.ce.utexas.edu/prof/bhat/COURSES/LM\\_Draft\\_060131Final-060630.pdf](http://www.ce.utexas.edu/prof/bhat/COURSES/LM_Draft_060131Final-060630.pdf)

T Train, Kenneth: *Discrete Choice Models with Simulation*, 2<sup>nd</sup> Ed., Cambridge University Press, 2009. <http://elsa.berkeley.edu/books/choice2.html>

**Academic Integrity:**

The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at [www.governance.ualberta.ca](http://www.governance.ualberta.ca)) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

Policy about course outlines can be found in §23.4(2) of the University Calendar.

**Class Schedule**

Please note that this schedule is tentative and subject to changes throughout the term

| Week | Date  | Topic   | Recommended readings                                       | Assignments  |
|------|-------|---|--|--------------|
| 1    | 09-06 | Introduction; supply & demand; optimization                 | N(1)/PR(2: 19-30); DN(3)/N(2: 21-55)                       | (Assign 5)   |
| 2    | 09-13 | Production functions; cost functions                        | DN(2)/N(9); DN(4)/N(10)                                    |              |
| 3    | 09-20 | Utility theory  | N(3)/PR(3.1-2; pp 141-3)                                   | Assignment 1 |
| 4    | 09-27 | Individual and market demand functions                      | N(4)/PR(4.1-2); N(5)/PR(4.3-4)                             |              |
| 5    | 10-04 | Market equilibrium  | N(11-13) / PR(8-10); S(1-3)                                |              |
| 6    | 10-11 | Model estimation  | Handout; TBA   | Assignment 2 |
| 7    | 10-18 | Disaggregate choice theory; random utility models           | T(p 3-5; ch2), KB(p 1-5; Ch 2-3; T(3), KB(4), W(13.1-13.4) |              |
| 8    | 10-25 | Logit   | T(3), KB(4), W(13.3, 13.5)                                 |              |
| 9    | 11-01 | Nested logit  | T(4), KB(8), W(13.6)                                       | Assignment 3 |
| 10   | 11-08 | <i>Reading week</i>   |  |              |
| 11   | 11-15 | Other models (mixed logit, probit, ordered); data; examples | T(6), W(16.1,14)   | Assignment 4 |
| 12   | 11-22 | Transportation network equilibrium                          | S(5-6)   |              |
| 13   | 11-29 | Multi-objective decision making; review                     | DN(8)  | Assignment 5 |
| 14   | 12-06 | Final exam  |  |              |

- All reading references are from the text editions listed previously. The libraries have older editions that likely do contain all the readings, but in different chapters and pages.
- If you would like a refresher on statistics basics you can read Nicholson pp 67-76.