

CVEN9407

Transport Modelling

Term 2, 2022



Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Taha Hossein Rashidi	rashidi@unsw.edu.au			

School Contact Information

[Engineering Student Support Services](#) – The Nucleus - enrolment, progression checks, clash requests, course issues or program-related queries

[Engineering Industrial Training](#) – Industrial training questions

[UNSW Study Abroad](#) – study abroad student enquiries (for inbound students)

[UNSW Exchange](#) – student exchange enquiries (for inbound students)

[UNSW Future Students](#) – potential student enquiries e.g. admissions, fees, programs, credit transfer

Phone

(+61 2) 9385 8500 – Nucleus Student Hub

(+61 2) 9385 7661 – Engineering Industrial Training

(+61 2) 9385 3179 – UNSW Study Abroad and UNSW Exchange (for inbound students)

Course Details

Units of Credit 6

Summary of the Course

Modelling transportation demand and safety; a broad range of econometric modelling techniques and its application to transportation systems will be considered; specific emphasis will be placed on estimation of these models and their use for forecasting and interpretation of results; transportation data, analysis and modelling including considerations of data sources, errors, time series analysis, stochastic models and extensions to simulation and optimisation in transportation systems.

Course Aims

Objective of the course is to impart advanced knowledge in transport modelling with a focus on application to traffic demand, safety and urban planning. The course will focus on econometric modelling techniques and statistical estimation used in traffic demand and safety planning and engineering. Assignments and class projects will require students to apply these methods to real datasets.

Course Learning Outcomes

1. Learning basic statistics and econometrics in transport modelling
2. Identifying the properties of random variables in different types of regression models
3. Complete a comprehensive statistical analysis on a real world data using statistical packages
4. By the conclusion of this course the student will be able to develop knowledge and skills in inferring statistical conclusions from real world data

Teaching Strategies

Private Study

- Review lecture material and research literature
- Do set problems and assignments
- Reflect on class problems, assignments & literature review
- Do internet and library searches on topics related to the course
- Participate in class discussions
- Utilize material taught in class and learnt from literature review, to develop innovative solutions for the class project

Lectures

- Find out what you must learn
- Follow worked theory and examples
- Hear announcements on course changes

Workshops

- Be guided by demonstrators
- Practice solving set problems
- Ask questions

Assessments (tests, examinations, assignments)

- Demonstrate your knowledge and skills
- Demonstrate higher understanding and problem solving

Assessment

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Quiz 1	3%	06/06/2022 08:15 AM	1
2. Quiz 2	3%	20/06/2022 08:15 AM	1, 2
3. Quiz 3	3%	27/06/2022 08:15 AM	1, 2, 3
4. Quiz 4	3%	11/07/2022 08:15 AM	2, 3
5. Quiz 5	3%	08/08/2022 08:15 AM	3
6. Assignment 1	15%	11/07/2022	1, 3, 4
7. Assignment 2	15%	25/07/2022	1, 2, 3, 4
8. Assignment 3	15%	15/08/2022	1, 2, 3, 4
9. Final Exam	40%	Exams week	1, 2, 3, 4

Assessment 1: Quiz 1

Start date: 06/06/2022 08:00 AM

Due date: 06/06/2022 08:15 AM

Students will be assessed based on the accuracy and validity of their submitted solutions to the questions.

Additional details

Comprehensive understanding of basic statistics and probabilities

Assessment 2: Quiz 2

Start date: 20/06/2022 08:00 AM

Due date: 20/06/2022 08:15 AM

Understanding about the basic assumptions behind linear regression models.

Students will be assessed based on the accuracy and validity of their submitted solutions to the questions.

Assessment 3: Quiz 3

Start date: 27/06/2022 08:00 AM

Due date: 27/06/2022 08:15 AM

Potential troubles resulting from violating the assumptions and common remedies for them.

Students will be assessed based on the accuracy and validity of their submitted solutions to the questions.

Assessment 4: Quiz 4

Start date: 11/07/2022 08:00 AM

Due date: 11/07/2022 08:15 AM

Time series regression and count data

Students will be assessed based on the accuracy and validity of their submitted solutions to the questions.

Assessment 5: Quiz 5

Start date: 08/08/2022 08:00 AM

Due date: 08/08/2022 08:15 AM

Discrete choice modelling

Students will be assessed based on the accuracy and validity of their submitted solutions to the questions.

Assessment 6: Assignment 1

Start date: 27/06/2022

Due date: 11/07/2022

Linear regression

A hands on project with real world data

Assessment 7: Assignment 2

Start date: 11/07/2022

Due date: 25/07/2022

Time series regression and count data

A hands on project with real world data

Assessment 8: Assignment 3

Start date: 01/08/2022

Due date: 15/08/2022

Discrete Choice modelling

Assessing students' knowledge about models for non-continuous dependent variables

A hands on project with synthesised data

Assessment 9: Final Exam

Due date: Exams week

Covering all topic covered in the course.

The pass mark in this course is 50% overall, however, students must score at least 40% in the final examination in order to qualify for a Pass in this course (double hurdle).

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

Course Schedule

Due to a public holiday on the 13th of June, there is no in-person teaching on this specific week, and the course materials will be available online for your review. All other weeks are offered in a hybrid mode.

A table of lectures and workshops or practical class topics for each week, indicating the name of the lecturer involved (where multiple lecturers teaching in the course), online activities, such as discussion forums, and relevant readings from textbooks and other reference material identified for the course.

[View class timetable](#)

Timetable

Date	Type	Content
O-Week: 23 May - 27 May		
Week 1: 30 May - 3 June	Lecture	Topic: Introduction to transport modelling Statistical inference Lecture Content: Basics of econometrics Review of statistics and probabilities Statistical hypothesis testing Demonstration Content: Introduction to R
Week 2: 6 June - 10 June	Lecture	Topic: Statistical inference Regression analysis Lecture Content: Two-variable regression assumptions

		<p>Dummy variables</p> <p>Demonstration Content:</p> <p>Running regression in R</p>
	Assessment	Quiz 1
Week 3: 13 June - 17 June	Lecture	<p>***** No in person teaching*****</p> <p>***** Course materials will be available online*****</p> <p>Topic:</p> <p>Regression analysis</p> <p>Lecture Content:</p> <p>Multiple regression analysis</p> <p>Multicollinearity</p> <p>Count data</p> <p>Demonstration Content:</p> <p>Running multiple regression in R</p>
Week 4: 20 June - 24 June	Lecture	<p>Topic:</p> <p>Regression model troubleshooting</p> <p>Lecture Content:</p> <p>Heteroscedasticity</p> <p>Autocorrelation</p> <p>Demonstration Content:</p> <p>Heteroscedasticity</p> <p>Autocorrelation</p>
	Assessment	Quiz 2
Week 5: 27 June - 1 July	Lecture	<p>Topic:</p> <p>Regression Model Time Series</p>

		Lecture Content: Time series formulations and Count Data Demonstration Content: Running time series in R
	Assessment	Quiz 3
Week 6: 4 July - 8 July	Reading	<i>Flexibility week for all courses (non-teaching)</i>
Week 7: 11 July - 15 July	Lecture	Topic: Discrete choice Lecture Content: Basic definitions Choice set Logit models Demonstration Content: Running logit with biogeme
	Assessment	Quiz 4
Week 8: 18 July - 22 July	Lecture	Topic: Discrete choice Lecture Content: Nested logit Demonstration Content: Running nested logit with biogeme
Week 9: 25 July - 29 July	Lecture	Topic: Discrete choice Lecture Content: Ordered logit Demonstration Content: Running Ordered logit with biogeme

Week 10: 1 August - 5 August	Lecture	Topic: Survival analysis Lecture Content: Baseline hazard, definition and interpretations Demonstration Content: Estimating Cox Proportional Hazard in R
Study Week: 8 August - 11 August	Assessment	Quiz 5

Resources

Prescribed Resources

Material essential for this course is provided in lecture notes available through Moodle.

Suggested references are listed below:

- Gujarati, D.N. (2004) Basic Econometrics, 4th Edition, McGraw Hill
- Casella, G., and R.L. Berger (2001) Statistical Inference, 2nd Edition, Duxbury Press
- Train, K. (2009) Discrete Choice Methods with Simulation, 2nd Edition, Cambridge University Press
- Washington, S. P., M. G. Karlaftis and F. L. Mannering (2011) Statistical and Econometric Methods for Transportation Data Analysis, CRC Press Taylor and Francis Group
- Alain Zuur, Elena N. Ieno, Erik Meesters (2009) A Beginner's Guide to R, Springer
- Randall Schumacker, Sara Tomek (2013) Understanding Statistics Using R, Springer

Submission of Assessment Tasks

Please refer to the Moodle page of the course for further guidance on assessment submission.

UNSW has a standard late submission penalty of:

- 5% per day, for all assessments where a penalty applies, capped at five days (120 hours), after which a student cannot submit an assessment, and no permitted variation.

Academic Honesty and Plagiarism

Beware! An assignment that includes plagiarised material will receive a 0% Fail, and students who plagiarise may fail the course. Students who plagiarise are also liable to disciplinary action, including exclusion from enrolment.

Plagiarism is the use of another person's work or ideas as if they were your own. When it is necessary or desirable to use other people's material you should adequately acknowledge whose words or ideas they are and where you found them (giving the complete reference details, including page number(s)). The Learning Centre provides further information on what constitutes Plagiarism at:

<https://student.unsw.edu.au/plagiarism>

Academic Information

Final Examinations:

Final exams in T2 2022 will be held online between 12th - 25th August 2022 inclusive, and supplementary exams between 5th - 9th September 2022 inclusive. You are required to be available on these dates. Please do not to make any personal or travel arrangements during this period.

ACADEMIC ADVICE

- Key Staff to Contact for Academic Advice (log in with your zID and password): <https://intranet.civeng.unsw.edu.au/key-staff-to-contact-during-your-studies-at-unsw>
- [Key UNSW Dates](#) - eg. Census Date, exam dates, last day to drop a course without academic/financial liability etc.
- CVEN Student Intranet (log in with your zID and password): <https://intranet.civeng.unsw.edu.au/student-intranet>
- Student Life at CVEN, including Student Societies: <https://www.unsw.edu.au/engineering/civil-and-environmental-engineering/student-life>
- Special Consideration: <https://student.unsw.edu.au/special-consideration>
- General and Program-Specific Questions: [The Nucleus: Student Hub](#)
- Book an Academic Advising session: <https://app.acuityscheduling.com/schedule.php?owner=19024765>

Disclaimer

This course outline sets out description of classes at the date the Course Outline is published. The nature of classes may change during the Term after the Course Outline is published. Moodle should be consulted for the up to date class descriptions. If there is any inconsistency in the description of activities between the University timetable and the Course Outline (as updated in Moodle), the description in the Course Outline/Moodle applies.

Image Credit

Mike Gal.

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Acknowledgement of Country

We acknowledge the Bedegal people who are the traditional custodians of the lands on which UNSW Kensington campus is located.