



UNSW Course Outline

ZEIT3607 Transport Planning and Engineering - 2024

Published on the 11 Feb 2024

General Course Information

Course Code : ZEIT3607

Year : 2024

Term : Semester 1

Teaching Period : Z1

Is a multi-term course? : No

Faculty : UNSW Canberra

Academic Unit : School of Engineering and Technology

Delivery Mode : In Person

Delivery Format : Standard

Delivery Location : UNSW Canberra at ADFA

Campus : UNSW Canberra

Study Level : Undergraduate

Units of Credit : 6

Useful Links

[Handbook Class Timetable](#)

Course Details & Outcomes

Course Description

This course provides an introduction to the standard practice in transport planning and traffic engineering. It will cover the basic topics of travel demand forecasting and traffic flow theory for civil engineering applications.

The course contents include four-step transport planning method, trip generation, trip distribution, mode choice, traffic assignment, traffic flow diagrams, geometric design, and horizontal and vertical alignments of highways.

Basic knowledge in statistics, surveying and engineering drawing is required.

Course Aims

The goal of this course is to offer students a thorough comprehension of standard practices in transport planning and traffic engineering. Covering fundamental topics in transport studies for civil engineering applications, the course highlights the application of mathematical methods at different stages of transport planning and engineering. It also provides insight into the fundamental characteristics of transport systems. Furthermore, students will gain an understanding of the standard processes involved in strategic transport planning. Ultimately, the course aims to equip students with the knowledge and skills essential for proficiency in the realm of transport planning and traffic engineering.

Course Learning Outcomes

Course Learning Outcomes	Engineers Australia - Professional Engineer (Stage 1)
CLO1 : Apply mathematical methods related to various stages of transport planning and travel demand forecasting	<ul style="list-style-type: none">• PEE2.1 : Application of established engineering methods to complex engineering problem solving• PEE2.4 : Application of systematic approaches to the conduct and management of projects within the technology domain
CLO2 : Design vertical and horizontal alignments in geometric design	<ul style="list-style-type: none">• PEE1.5 : Knowledge of engineering design practice and contextual factors impacting the engineering discipline
CLO3 : Explain the basic characteristics of transport systems	<ul style="list-style-type: none">• PEE1.1 : Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline
CLO4 : Explain the standard processes for strategic transport planning	<ul style="list-style-type: none">• PEE3.2 : Effective oral and written communication in professional and lay domains

Course Learning Outcomes	Assessment Item
CLO1 : Apply mathematical methods related to various stages of transport planning and travel demand forecasting	<ul style="list-style-type: none">• Project 1• Quizzes
CLO2 : Design vertical and horizontal alignments in geometric design	<ul style="list-style-type: none">• Project 2• Quizzes
CLO3 : Explain the basic characteristics of transport systems	<ul style="list-style-type: none">• Project 1• Project 2• Quizzes
CLO4 : Explain the standard processes for strategic transport planning	<ul style="list-style-type: none">• Project 1• Quizzes

Learning and Teaching Technologies

Moodle - Learning Management System

Learning and Teaching in this course

Course materials will be delivered in weekly lectures in an interactive environment designed to engage students through group learning activities and by gamifying the concepts. The workshops provide an opportunity for students to become responsible for their learning and

received formative feedback from the lecturer to facilitate their learning. During the workshops, students are also provided the opportunity to work on their projects and discuss any question they may have with the lecturer or ask for clarification if needed.

I believe in purposeful learning philosophy. Under this philosophy, the program of a degree and the syllabuses of its courses are designed meticulously to fulfil valuable purposes; students are completely aware of the purpose of their studies; and lecturers are mindful of the purpose of their practice.

The Learning Management System

Moodle is the Learning Management System used at UNSW Canberra. All courses have a Moodle site which will become available to students at least one week before the start of semester. Please find all help and documentation (including Blackboard Collaborate) at the [Moodle Support](#) page.

UNSW Moodle supports the following web browsers:

» Google Chrome 50+

» Safari 10+

** Internet Explorer is not recommended

** Addons and Toolbars can affect any browser's performance.

Operating systems recommended are:

Windows 7, 10, Mac OSX Sierra, iPad IOS10

For further details about system requirements click [here](#).

Log in to Moodle [here](#).

If you need further assistance with Moodle:

For enrolment and login issues please contact:

IT Service Centre

Email: itservicecentre@unsw.edu.au

Phone: (02) 9385-1333

International: +61 2 9385 1333

For all other Moodle issues please contact:

External TELT Support

Email: externalteltsupport@unsw.edu.au

Phone: (02) 9385-3331

International: +61 2 938 53331

Opening hours:

Monday – Friday 7:30am – 9:30 pm

Saturday & Sunday 8:30 am – 4:30pm

Additional Course Information

Study at UNSW Canberra

<https://www.unsw.adfa.edu.au/study>

Study at UNSW Canberra has lots of useful information regarding:

- Where to get help
- Administrative matters
- Getting your passwords set up
- How to log on to Moodle
- Accessing the Library and other areas.

Academic Integrity and Plagiarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to this principle of academic integrity. All students are expected to adhere to UNSW's Student Code of Conduct

<https://www.unsw.edu.au/content/dam/pdfs/governance/policy/accessible/studentcode.pdf>

Plagiarism undermines academic integrity and is not tolerated at UNSW. *It is defined as using the words or ideas of others and passing them off as your own, and can take many forms, from deliberate cheating to accidental copying from a source without acknowledgement.*

For more information, please refer to the following:

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

Referencing

In this course, students are required to reference following the Chicago NB referencing style.
Information about referencing styles is available at: <https://guides.lib.unsw.adfa.edu.au/c.php?g=472948&p=3246720>

CRICOS Provider no. 00098G

The University of New South Wales Canberra.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates	Engineers Australia - Professional Engineer (Stage 1)
Project 1 Assessment Format: Group	30%	Start Date: Not Applicable Due Date: 10/05/2024 05:00 PM	<ul style="list-style-type: none">• PEE1.2 : Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline• PEE2.1 : Application of established engineering methods to complex engineering problem solving• PEE3.2 : Effective oral and written communication in professional and lay domains• PEE3.6 : Effective team membership and team leadership
Quizzes Assessment Format: Individual	40%	Start Date: Not Applicable Due Date: Not Applicable	<ul style="list-style-type: none">• PEE1.3 : In-depth understanding of specialist bodies of knowledge within the engineering discipline• PEE2.1 : Application of established engineering methods to complex engineering problem solving• PEE3.2 : Effective oral and written communication in professional and lay domains
Project 2 Assessment Format: Group	30%	Start Date: Not Applicable Due Date: 17/06/2024 05:00 PM	<ul style="list-style-type: none">• PEE1.2 : Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline• PEE2.2 : Fluent application of engineering techniques, tools and resources• PEE3.2 : Effective oral and written communication in professional and lay domains• PEE3.6 : Effective team membership and team leadership

Assessment Details

Project 1

Assessment Overview

The second assessment component comprises two group-based projects contributing to 60% of the final grade in total.

For the projects, students are required to submit a group report and independent individual reports reflecting on their contribution to the project. It is also mandatory to submit all the supporting materials (e.g. programming scripts and excel files developed in the project) with the group submission. Projects without supporting materials will not be evaluated and a grade of 0 will be applied to all group members.

Course Learning Outcomes

- CL01 : Apply mathematical methods related to various stages of transport planning and travel demand forecasting
- CL03 : Explain the basic characteristics of transport systems
- CL04 : Explain the standard processes for strategic transport planning

Detailed Assessment Description

This group project aims to familiarize students with the fundamental theories and methods involved in transport planning processes. This project focuses on a hypothetical transport study for a university campus in Reid Canberra. The necessary dataset is obtained from a travel survey of a sample of students and staff.

The group reports must be a reflection of the overall performance of the group and the individual reports must clarify the role and contribution of each group member. **Students will be assessed individually**, based on their group and individual reports, therefore members of a group will receive different marks depending on their contribution and performance.

Marks for the assessment tasks will be given with consideration to:

- Understanding of principles – we are looking to see that you are able to comprehend the project needs and apply the basic concepts to the engineering questions– i.e. translate problems into simplified form, solve, then interpret in real-world terms.
- Correctness – look for ways to validate your results with, e.g., redundant calculations or checking back to original question.

- Clarity – Effective communication is an essential component in any project. all steps should be concisely presented in the report so that an independent engineer would be able to check every calculation. Also, it should be very easy for the marker to identify the steps and the answer to the question. This is very important from the point of view of effective communication.

Assessment Length

9 weeks

Assignment submission Turnitin type

This is not a Turnitin assignment

Hurdle rules

Students must score at least 40% in each of the projects in order to qualify for a Pass in this course.

Quizzes

Assessment Overview

The first component includes three individual-based quizzes contributing to 40% of the final grade in total. Each quiz will take around one hour to complete. The quizzes will run during workshop hours. Late attempt is not accepted for the quizzes.

Course Learning Outcomes

- CL01 : Apply mathematical methods related to various stages of transport planning and travel demand forecasting
- CL02 : Design vertical and horizontal alignments in geometric design
- CL03 : Explain the basic characteristics of transport systems
- CL04 : Explain the standard processes for strategic transport planning

Detailed Assessment Description

The first component includes three individual-based quizzes contributing to 40% of the final grade in total. Each quiz will take between 60 to 90 minutes to complete. The quizzes will run during workshop hours. Late attempt is not accepted for the quizzes.

Quiz 1 carries 10% of the course total mark and is held in week 3 (March 15th)

Quiz 2 contributes to 20% of the course total make and is held in week 8 (May 3rd)

Quiz 3 has 10% of the course total mark and is held in week 13 (June 7th)

Assessment Length

60-90 minutes

Assignment submission Turnitin type

Not Applicable

Project 2

Assessment Overview

The second assessment component comprises two group-based projects contributing to 60% of the final grade in total.

For the projects, students are required to submit a group report and independent individual reports reflecting on their contribution to the project. It is also mandatory to submit all the supporting materials (e.g. programming scripts and excel files developed in the project) with the group submission. Projects without supporting materials will not be evaluated and a grade of 0 will be applied to all group members.

Course Learning Outcomes

- CL02 : Design vertical and horizontal alignments in geometric design
- CL03 : Explain the basic characteristics of transport systems

Detailed Assessment Description

This assessment task revolves around a road design project, aiming to gauge students' comprehension of the fundamental principles of road geometric design.

As a transport engineer, your role in this study is crucial as you undertake the following responsibilities:

- Understand and determine the design parameters for the project, which include:
 - Road function: Identifying the intended purpose and usage of the road.
 - Operating speed: Assessing and selecting an appropriate speed for the road.
 - Design vehicle: Choosing the type of vehicle(s) the road design should accommodate.
 - Cross-section: Defining the desired shape and dimensions of the road.
- Propose a suitable corridor that effectively connects the mandatory points provided. This involves designing a route that optimally links the specified locations.
- Generate a preliminary road design by creating a detailed layout that incorporates the design parameters and the proposed corridor. This includes determining the alignment, curves, gradients, and other essential elements.
- Prepare road design drawings as outlined in the project brief. This entails creating accurate and comprehensive drawings that illustrate the road design, including cross-sections, profiles,

and any other required details.

The group reports must be a reflection of the overall performance of the group and the individual reports must clarify the role and contribution of each group member. **Students will be assessed individually**, based on their group and individual reports, therefore members of a group will receive different marks depending on their contribution and performance.

Marks for the assessment tasks will be given with consideration to:

- Understanding of principles – we are looking to see that you are able to comprehend the project needs and apply the basic concepts to the engineering questions– i.e. translate problems into simplified form, solve, then interpret in real-world terms.
- Correctness – look for ways to validate your results with, e.g., redundant calculations or checking back to original question.
- Clarity – Effective communication is an essential component in any project. all steps should be concisely presented in the report so that an independent engineer would be able to check every calculation. Also, it should be very easy for the marker to identify the steps and the answer to the question. This is very important from the point of view of effective communication.

Assessment Length

6 weeks

Assignment submission Turnitin type

This is not a Turnitin assignment

Hurdle rules

Students must score at least 40% in each of the projects in order to qualify for a Pass in this course.

General Assessment Information

This course does not have a final exam. Students' performance will be evaluated based on two assessment components: (1) three individual quizzes and (2) two group projects on transport planning and road design.

The first component includes three individual-based quizzes contributing to 40% of the final grade in total.

Quiz 1 will be held in week 3, feedback, grades and worked solutions will be given to students during week 4

The second assessment component comprises two group-based projects contributing to 60% of the final grade in total.

For the projects, students are required to submit a group report and independent individual reports reflecting on their contribution to the project. It is also mandatory to submit all the supporting materials (e.g. programming scripts and excel files developed in the project) with the group submission. Projects without supporting materials will not be evaluated and a grade of 0 will be applied to all group members.

The group reports must be a reflection of the overall performance of the group and the individual reports must clarify the role and contribution of each group member. Students will be assessed individually, based on their group and individual reports, therefore members of a group will receive different marks depending on their contribution and performance.

Late Submission

- For Quizzes, no late submission is allowed.
- For project 1 final report, unless a prior arrangement is made with the lecturer or a formal application for special consideration is submitted, a penalty of 5% of the total available mark for the assessment will apply for each day that an assessment item is late up to a maximum of 5 days (120 hours) after which an assessment can no longer be submitted and a grade of 0 will be applied
- For project 2 final report, no late submission is allowed.

Note: Penalties for late submission should apply from the original submission date, unless that date is formally varied by agreement. If a late submission is allowed, the extra time granted should be viewed solely as a period of grace. If this delayed date is not met, the penalty should apply from the original date of submission, not from the end of the period of grace.

Use of Generative AI

The use of generative AI tools is allowed for the completion of the projects; however, students are required to explicitly acknowledge the extent and manner in which these tools have been employed in their work.

You can use generative AI software in this assessment to the extent specified in the assessment instructions. Any output of generative software within your assessment must be attributed with

full referencing.

If the outputs of generative AI such as ChatGPT form part of your submission and is not appropriately attributed, it will be regarded as serious academic misconduct and subject to the standard penalties, which may include 00FL, suspension and exclusion.

** To cite: OpenAI (Year Accessed). ChatGPT. OpenAI. <https://openai.com/models/chatgpt/>*

** Please note that the outputs from these tools are not always accurate, appropriate, nor properly referenced. You should ensure that you have moderated and critically evaluated the outputs from generative AI tools such as ChatGPT before submission.*

Grading Basis

Standard

Requirements to pass course

The overall passing mark is set at 50%; however, students must score at least 40% in each of the projects in order to qualify for a Pass in this course. The two projects are compulsory components in this course.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 26 February - 1 March	Lecture	Course administration, Introduction to four-step modelling Trip generation <ul style="list-style-type: none"> • Zoning system • Growth rate models • Cross table models
	Tutorial	Presenting project 1 brief Introducing R
Week 2 : 4 March - 8 March	Lecture	Trip generation <ul style="list-style-type: none"> • Regression analysis • Model estimation
	Tutorial	Trip generation <ul style="list-style-type: none"> • Regression analysis • Model estimation
Week 3 : 11 March - 15 March	Lecture	Trip distribution <ul style="list-style-type: none"> • Fratar model • Gravity model • Model estimation
	Assessment	Quiz 1 - 15 March 4 pm
Week 4 : 18 March - 22 March	Lecture	Mode choice <ul style="list-style-type: none"> • Utility maximisation theory • Discrete choice models
	Tutorial	Trip distribution <ul style="list-style-type: none"> • Fratar model • Gravity model • Model estimation
Week 5 : 25 March - 29 March	Lecture	Mode choice model estimation
Week 6 : 1 April - 5 April	Lecture	Mode choice model simulation
	Tutorial	Mode choice model estimation and simulation
Week 7 : 22 April - 26 April	Tutorial	Mode choice model estimation and simulation
Week 8 : 29 April - 3 May	Lecture	Traffic assignment <ul style="list-style-type: none"> • User equilibrium • Cost volume function • Static traffic assignment
	Assessment	Quiz 2 - 3 May 4 pm
Week 9 : 6 May - 10 May	Lecture	Highway capacity and level of service Fundamental of traffic flow
	Assessment	Project 1 due on 10 May
Week 10 : 13 May - 17 May	Lecture	Introduction to road design, Road characteristics, Design characteristics
	Tutorial	Presenting Project 2 brief
Week 11 : 20 May - 24 May	Lecture	Horizontal alignment - Superelevation
	Tutorial	Horizontal alignment
Week 12 : 27 May - 31 May	Lecture	Vertical alignment <ul style="list-style-type: none"> • Speed parameters • Stopping sight distance
	Tutorial	Vertical alignment
Week 13 : 3 June - 7 June	Lecture	Cross sections Earthworks
	Assessment	Quiz 3 - 7 June 4 pm

Attendance Requirements

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

General Schedule Information

Week 5 - No tutorial on 29 March - Good Friday

Week 7 - No Lecture on 25 April - Anzac Day

Week 9 - No tutorial on 10 May - Military Training

Course Resources

Prescribed Resources

There is no compulsory textbook for this course.

Recommended Resources

- *Austroads Guide to Traffic Management, Part 1 to Part 13. The Guide is available to download from the website: <https://austroads.com.au/network-operations/network-management/guide-to-traffic-management>*
- *Mannering, F.L., & Washburn, S. S. (2019), Principles of Highway Engineering and Traffic Analysis, John Wiley & Sons.*
- *Black, J. (1981) Urban Transport Planning: Theory and Practice, (London: Croom Helm).*
- *Train, K. (2009) Discrete Choice Methods with Simulation, 2nd Edition, Cambridge University Press*

Course Evaluation and Development

One of the key priorities in the 2025 Strategy for UNSW is a drive for academic excellence in education. One of the ways of determining how well UNSW is progressing towards this goal is by listening to our own students. Students will be asked to complete the myExperience survey towards the end of this course.

Students can also provide feedback during the semester via: direct contact with the lecturer, the “On-going Student Feedback” link in Moodle, Student-Staff Liaison Committee meetings in schools, informal feedback conducted by staff, and focus groups. Student opinions really do make a difference. Refer to the Moodle site for this course to see how the feedback from previous students has contributed to the course development.

Important note: Students are reminded that any feedback provided should be constructive and

professional and that they are bound by the Student Code of Conduct Policy

<https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf>

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Lecturer	Milad Ghasrihouzani		107, building 20	5114 5152	I am usually available for consultation on Wednesdays during normal working hours. Please email to make an appointment.	No	Yes

Other Useful Information

Academic Information

Course Evaluation and Development

One of the key priorities in the 2025 Strategy for UNSW is a drive for academic excellence in education. One of the ways of determining how well UNSW is progressing towards this goal is by listening to our own students. Students will be asked to complete the myExperience survey towards the end of each course.

Students can also provide feedback during the semester via: direct contact with the lecturer, the “On-going Student Feedback” link in Moodle, Student-Staff Liaison Committee meetings in schools, informal feedback conducted by staff, and focus groups (where applicable). Student opinions really do make a difference. Refer to the Moodle site for your course to see how the feedback from previous students has contributed to the course development.

Important note: Students are reminded that any feedback provided should be constructive and professional and that they are bound by the Student Code of Conduct.

<https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf>

Equitable Learning Services (ELS)

Students living with neurodivergent, physical and/or mental health conditions or caring for someone with these conditions may be eligible for support through the Equitable Learning Services team. Equitable Learning Services is a free and confidential service that provides

practical support to ensure your mental or physical health conditions do not adversely affect your studies.

Our team of dedicated **Equitable Learning Facilitators (ELFs)** are here to assist you through this process. We offer a number of services to make your education at UNSW easier and more equitable.

Further information about ELS for currently enrolled students can be found at: <https://www.student.unsw.edu.au/equitable-learning>

Academic Honesty and Plagiarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to this principle of academic integrity. All students are expected to adhere to UNSW's Student Code of Conduct. Find relevant information at: [Student Code of Conduct \(unsw.edu.au\)](https://www.student.unsw.edu.au/student-code-of-conduct)

Plagiarism undermines academic integrity and is not tolerated at UNSW. It is defined as using the words or ideas of others and passing them off as your own, and can take many forms, from deliberate cheating to accidental copying from a source without acknowledgement.

For more information, please refer to the following:

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

Submission of Assessment Tasks

Special Consideration

Special Consideration is the process for assessing and addressing the impact on students of short-term events, that are beyond the control of the student, and that affect performance in a specific assessment task or tasks.

Applications for Special Consideration will be accepted in the following circumstances only:

- Where academic work has been hampered to a substantial degree by illness or other cause;
- The circumstances are unexpected and beyond the student's control;
- The circumstances could not have reasonably been anticipated, avoided or guarded against by the student; and either:

(i) they occurred during a critical study period and was 3 consecutive days or more duration, or a total of 5 days within the critical study period; or

(ii) they prevented the ability to complete, attend or submit an assessment task for a specific date (e.g. final exam, in class test/quiz, in class presentation)

Applications for Special Consideration must be made as soon as practicable after the problem occurs and at the latest within three working days of the assessment or the period covered by the supporting documentation.

By sitting or submitting the assessment task the student is declaring that they are fit to do so and cannot later apply for Special Consideration (UNSW 'fit to sit or submit' requirement).

Sitting, accessing or submitting an assessment task on the scheduled assessment date, after applying for special consideration, renders the special consideration application void.

Find more information about special consideration at: <https://www.student.unsw.edu.au/special/consideration/guide>

Or apply for special consideration through your [MyUNSW portal](#).

Late Submission of assessment tasks (other than examinations)

UNSW has a standard late submission penalty of:

- 5% per day,
- capped at five days (120 hours) from the assessment deadline, after which a student cannot submit an assessment, and
- no permitted variation.

Students are expected to manage their time to meet deadlines and to request extensions as early as possible before the deadline.

Electronic submission of assessment

Except where the nature of an assessment task precludes its electronic submission, all assessments must be submitted to an electronic repository, approved by UNSW or the Faculty, for archiving and subsequent marking and analysis.

Release of final mark

All marks obtained for assessment items during the session are provisional. The final mark as published by the university following the assessment review group meeting is the only official mark.