CVEN9421

Transport Logistics Engineering

Term 1, 2023

Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Elnaz (Elli) Irannezhad	e.irannezhad@unsw.edu.au	9 am - 5 pm	105 H20	(+61 2) 9385 5056

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

This postgraduate course covers concepts of transport logistical systems and supply chain management. While somewhat relevant to business management, the focus of this course will be on engineering methods such as optimisation techniques, simulation and logistics data analytics and emerging information systems and supply chain technologies. The course contents can be summarised into 7 main logistics engineering subjects:

1. identifying all important dimensions of logistics and supply chain modelling
2. the role of information systems in logistics such as the Internet of Things (IoT) and blockchain
3. simulation of logistics processes
4. freight demand modelling and the outbound side of logistics
5. mathematical optimisation of logistics systems and network design (e.g. facility location and routing)
6. resilient and green logistics
7. economics of logistics and performance measures

Course Aims

The aim of this course is to familiarise students with advanced engineering methods and creative engineering solutions to manage existing logistical systems as well as answer questions on transport infrastructure needs. After completing this course, students will have been exposed to mathematical and simulation methods and their application to solve transport and logistics decision-making problems. A technical site visit to Port Botany will be arranged so that students see the logistics process in practice. The project assignments and workshop exercises will be based on real-world examples from a broad class of logistics engineering problems in transport and industrial engineering, hence equipping students with versatile analytical skills. This course will help address the gap of transport logistics engineering in the Masters for Transportation Engineering Curriculum.

Course Learning Outcomes

After successfully completing this course, you should be able to:

Learning Outcome	EA Stage 1 Competencies
1. Have a good understanding of the practical application of basic concepts, methods and techniques in transport logistics problems	PE1.6
2. Develop familiarity and understanding of current state-of-art digital technologies being used in transport logistics engineering	PE2.4, PE1.6
3. Develop ability to critically analyze transport logistics systems	PE2.4, PE2.3
4. Model real work transport logistics problems	PE1.1, PE1.2
5. Understand and use optimization engines to solve complex and large scale transport logistics problems	PE1.2, PE2.2

Teaching Strategies

Please refer to the information in Moodle

Additional Course Information

Assessment

Assessment is based on three Assignments and a Final Examination:

- Assignment 1 is worth 15% of the course mark.
- Assignment 2 is worth 20% of the course mark.
- Assignment 3 is worth 15% of the course mark.
- The Final Examination is worth 50% of the course mark.

All assemments are evaluated on the technical merit and consistency of the methodology followed. Attention to the detail and demonstrated initiative in experimentation with concepts learned will be rewarded. Late assignment submissions will not be accepted.

The pass mark in this course is 50% overall.

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Assignment 1	15%	03/03/2023 11:59 PM	1, 2
2. Assignment 2	20%	27/03/2023 11:59 PM	3, 4
3. Assignment 3	15%	14/04/2023 11:59 PM	5
4. Final Exam	50%	Not Applicable	1, 2, 3, 4, 5

Assessment 1: Assignment 1

Start date: 13/02/2023 11:59 PM
Submission notes: Moodle
Due date: 03/03/2023 11:59 PM

Assignment 1 will be released in Week 1 and is due in Week 3. This assignment will consist of a short report in which the students should determine the key actors, decisions, and interactions across the supply chain of a given commodity. The assignment will assess the expected learning outcomes and will be assessed based on technical accuracy, clarity in reporting and presentation.

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Assessment 2: Assignment 2

Start date: 06/03/2023 07:00 PM
Submission notes: Moodle
Due date: 27/03/2023 11:59 PM

Assignment 2 will be released in Week 4 and is due in Week 7. This assignment will consist of a logistics simulation project in an Anylogic environment and will require setting up the simulation environment and analysing the logistics process and its bottlenecks. The assignment will assess the expected learning outcomes and will be assessed based on technical accuracy, clarity in reporting and presentation.

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Assessment 3: Assignment 3

Start date: 27/03/2023 07:00 PM
Assessment length: 2 hours
Submission notes: Moodle
Due date: 14/04/2023 11:59 PM

The Assignment 3 will be released in Week 7 and will be due in Week 9. This assignment will consist of a series of problems and focus on students implementing optimization algorithms for transport logistics problems presented during the course. The assignment will assess the expected learning outcomes and will be assessed based on technical accuracy, clarity in reporting and presentation.

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Assessment 4: Final Exam

Submission notes: Moodle

The final written examination will be in the conventional closed book format covering all topics introduced throughout the course. The final examination will consists of a series of problems and focus on theoretical and methodological concepts presented within the lectures as well as within previous assessments. The final examination will assess the expected learning outcomes and will be assessed based on technical accuracy, clarity in reporting and presentation.

Attendance Requirements

For courses with Workshops and/or Labs, attendance for those classes is a necessary part of the course. You must **attend at least 80% of the workshop/lab** in which you are enrolled for the duration of the session.

Course Schedule

View class timetable

Timetable

Date	Type	Content
Week 1: 13 February - 17 February	Lecture	Logistics and Supply Chain: Dimensions, Actors and Key Decisions
Week 2: 20 February - 24 February	Lecture	Digital Transformation of Logistics
Week 3: 27 February - 3 March	Lecture	Freight Demand Modelling
	Assessment	Assignment 1: Moodle
Week 4: 6 March - 10 March	Lecture	Logistics Network Design - Simulation with Anylogic
Week 5: 13 March - 17 March	Lecture	Logistics Optimisation Techniques
Week 7: 27 March - 31 March	Lecture	Logistics Network Design and Facility Location Problem
	Assessment	Assignment 2: Moodle
Week 8: 3 April - 7 April	Lecture	Vehicle Routing Problem
Week 9: 10 April - 14 April	Lecture	Economies and Resiliency of Logistics
	Assessment	Assignment 3: Moodle
Week 10: 17 April - 21 April	Lecture	Green Logistics Strategies and Future Challenges

Resources

Recommended Resources

Textbooks (**recommended as reference**)

- Chopra S, Meindl P. Strategy, planning, and operation. Supply Chain Management. 2001:13-7.
- Coyle JJ, Novack RA, Gibson B, Bardi EJ. Transportation: a global supply chain perspective. Cengage Learning; 2015 Apr 8.
- Larson, Richard C., and Amedeo R. Odoni. *Urban Operations Research*. Prentice Hall, 1981. Available at: http://web.mit.edu/urban_or_book/www/book/

Course Evaluation and Development

At the end of each session, a QR code will be provided to collect the students' feedback about the difficulty level and other comments. All comments will be analysed and be used to improve the course contents.

Laboratory Workshop Information

Students need to bring a laptop to the workshops. Anylogic and AMPL software will be used throughout the term and will be practiced in the workshops.

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 T1 2023 will be held on campus between the 28th of April and the11th of May, and Supplementary Exams between the 22nd of May and the 26th of May. 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://unswengacademicadvising.as.me/schedule.php

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

Photo taken by Elnaz Irannezhad

CRICOS

CRICOS Provider Code: 00098G

Acknowledgement of Country

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

Appendix: Engineers Australia (EA) Professional Engineer Competency Standard

Program Intended Learning Outcomes	
Knowledge and skill base	
PE1.1 Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline	✓
PE1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline	✓
PE1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline	
PE1.4 Discernment of knowledge development and research directions within the engineering discipline	
PE1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline	
PE1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline	✓
Engineering application ability	
PE2.1 Application of established engineering methods to complex engineering problem solving	
PE2.2 Fluent application of engineering techniques, tools and resources	✓
PE2.3 Application of systematic engineering synthesis and design processes	✓
PE2.4 Application of systematic approaches to the conduct and management of engineering projects	✓
Professional and personal attributes	
PE3.1 Ethical conduct and professional accountability	
PE3.2 Effective oral and written communication in professional and lay domains	
PE3.3 Creative, innovative and pro-active demeanour	
PE3.4 Professional use and management of information	
PE3.5 Orderly management of self, and professional conduct	
PE3.6 Effective team membership and team leadership	