

Annexe A: New/Revised Course Content in OBTL+ Format

Course Overview

Expected Implementation in Academic Year (New format)	AY2026-2027
Semester/Trimester/Others (specify approx. Start/End date)	Semester 1
Course Author * Faculty proposing/revising the course	A/P Wong Yiik Diew
Course Author Email	CYDWONG@ntu.edu.sg
Course Title	Transportation Engineering
Course Code	CV3014
Academic Units	3
Contact Hours	39
Research Experience Components	Not Applicable

Course Requisites (if applicable)

Pre-requisites	
Co-requisites	
Pre-requisite to	
Mutually exclusive to	
Replacement course to	
Remarks (if any)	

Course Aims

This course is open to Year 3 students. By the end of the course, you shall be equipped with essential knowledge of land transportation planning, traffic engineering and highway engineering. This knowledge is applied in planning, design and construction of land transport infrastructure.

Course's Intended Learning Outcomes (ILOs)

Upon the successful completion of this course, you (student) would be able to:

ILO 1	Identify the variety and complexity of land transportation as a system and as an engineering discipline
ILO 2	Apply the four-step process in transportation planning;
ILO 3	Define the traffic flow parameters by various methods of measurement
ILO 4	Apply the principles of traffic flow theory to calculate performance measures
ILO 5	Apply the key principles of geometric design for vertical and horizontal alignments of highways
ILO 6	Determine earthwork quantities for highway construction.
ILO 7	Describe the functions of road pavement as a civil engineering structure.
ILO 8	Apply pavement design concepts to design road pavement.

Course Content

1. Land transportation systems
2. Transportation planning
3. Traffic flow theory and studies
4. Geometric design of highways
5. Earthworks
6. Structural design of highways

Reading and References (if applicable)

Text

Banks, J.H., "Introduction to Transportation Engineering", 2nd ed., McGraw-Hill, 2002.

Supplementary reading materials are provided by instructors.

Teaching Faculty will provide up to date reading or reference materials when it is available.

Planned Schedule

Week or Session	Topics or Themes	ILO	Delivery Mode	Activities	Readings
1	Land Transportation Systems: Introduction to transportation planning process and transportation systems. Data and surveys for planning studies.	1, 2	In-person	Lecture & Tutorial	Lecture slides and Tutorial questions
2	Transportation Planning: Travel demand modelling.	2	In-person	Lecture & Tutorial	Lecture slides and Tutorial questions
3	Transportation Planning: Trip generation, trip distribution, modal split. Network analysis. Trip assignment.	2	In-person	Lecture & Tutorial	Lecture slides and Tutorial questions
4	Transportation Planning: Trip generation, trip distribution, modal split. Network analysis. Trip assignment.	2	In-person	Lecture & Tutorial	Lecture slides and Tutorial questions
5	Traffic Flow Theory and Studies: Traffic flow characteristics: flow, speed, density. Volume, speed and travel time surveys.	3	In-person	Lecture & Tutorial	Lecture slides and Tutorial questions
6	Geometric Design of Highways: The design process and standards. Design speed and sight distances. Design documentation. Vertical alignment	4, 5	In-person	Lecture & Tutorial	Lecture slides and Tutorial questions

Week or Session	Topics or Themes	ILO	Delivery Mode	Activities	Readings
7	Geometric Design of Highways: Horizontal alignment. Super-elevation. Intersections and Interchanges.	5	In-person	Lecture & Tutorial	Lecture slides and Tutorial questions
8	Geometric Design of Highways: Horizontal alignment. Super-elevation. Intersections and Interchanges.	5	In-person	Lecture & Tutorial	Lecture Slides and Tutorial Questions
9	Earthworks: Earthwork. Mass diagrams.	6	In-person	Lecture and Tutorial	Lecture Slides and Tutorial Questions
10	Structural Design of Highways: Components of flexible and rigid pavements. Design factors.	7	In-person	Lecture & Tutorial	Lecture Slides and Tutorial Questions
11	Structural Design of Highways: Components of flexible and rigid pavements. Design factors. Structural design of flexible pavement.	7,8	In-person	Lecture & Tutorial	Lecture Slides and Tutorial Questions
12	Structural Design of Highways: Stresses in rigid pavement. Joints and reinforcement. Structural design of rigid pavement.	7,8	In-person	Lecture & Tutorial	Lecture Slides and Tutorial Questions

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Lectures	Lecture sessions are conducted to a large group in lecture theatre, and all lectures are recorded. Instructors take questions at end of lectures. Instructors may provide on-the-spot clarifications, and during review of taught materials in class. Individual students can confer with instructors via emails or appointed face-to-face consultations. All these enhance the achievement of targeted learning outcomes.
Tutorials	Students are given problems related to prevailing lectures, and are to solve them in advance before the weekly face-to-face tutorial sessions conducted in small groups, in smart tutorial rooms. Students pose queries to tutor who share solution pointers in an interactive manner. Tutors also translate applied problems to the wider context of industry developments. Such practices serve to enhance the students' learning experience.

Assessment Structure

Assessment Components (includes both continuous and summative assessment)

No.	Component	ILO	Related PLO or Accreditation	Weightage	Description of Assessment Component	Team/Individual	Rubrics	Level of Understanding
1	Summative Assessment (EXAM): Final exam(The final exam will be assessing student's understanding on all the topics taught for the entire course.)	All (in above ILO section)	CVE SLO (2018): a, b, c	60	Physical exam will be conducted in an exam hall at the end of the semester.	Individual	Holistic	Relational
2	Continuous Assessment (CA): Test/Quiz(Continuous Assessment 1: Quiz 1)	1,2,3,4, 5 (in ILO section)	CVE SLO (2018) : a, b	20	Quiz 1 will be conducted physically around middle of the semester, during one of the scheduled lecture time slot.	Individual	Analytic	Multistructural
3	Continuous Assessment (CA): Test/Quiz(Continuous Assessment 2: Quiz 2)	1, 2, 3, 4, 5 (in ILO section)	CVE SLO (2018): a, b, c, d, i, j	20	Quiz 2 will be conducted physically towards to the end of the semester, during one of the scheduled lecture time slot.	Individual	Analytic	Multistructural

Description of Assessment Components (if applicable)

Please refer to the details listed under each components

Formative Feedback

Instructors take questions at end of lectures, and provide on-the-spot clarifications or at review in next lecture. Students also confer with instructors at tutorials, at appointed consultations or via email.

Students are assessed based on two Quizzes; feedbacks are given for the quiz in terms of summary quiz scores and instructors go through (in the lecture) common mistakes made by students.

Students are assessed by a team project; feedbacks on projects are given as and when required, and particularly at project presentation.

NTU Graduate Attributes/Competency Mapping

This course intends to develop the following graduate attributes and competencies (maximum 5 most relevant)

Attributes/Competency	Level
Care for Environment	Basic
Collaboration	Basic
Decision Making	Basic
Problem Solving	Basic
Critical Thinking	Basic

Course Policy

Policy (Academic Integrity)

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values. As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the academic integrity website for more information. On the use of technological tools (such as Generative AI tools), different courses / assignments have different intended learning outcomes. Students should refer to the specific assignment instructions on their use and requirements and/or consult your instructors on how you can use these tools to help your learning. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Policy (General)

As a student of the course, you are required to abide by both the University Code of Conduct and the Student Code of Conduct. The Codes provide information on the responsibilities of all NTU students, as well as examples of misconduct and details about how students can report suspected misconduct. The university also has the Student Mental Health Policy. The Policy states the University's commitment to providing a supportive environment for the holistic development of students, including the improvement of mental health and wellbeing. These policies and codes concerning students can be found in the following link.

<http://www.ntu.edu.sg/SAO/Pages/Policies-concerning-students.aspx>

Policy (Absenteeism)

In-class activities make up a significant portion of your course grade. Absence from class without a valid reason will affect your final grade. Valid reasons include falling sick supported by a medical certificate and participation in NTU's approved activities supported by an excuse letter from the relevant bodies. There will be no make-up opportunities for in-class activities.

Policy (Others, if applicable)

This course will adopt NTU's policy on the use of AI for take-home assignments and reports, and project reports and presentation slides. More details could be found via the link

[https://entuedu.sharepoint.com/sites/Student/dept/ctlp/SitePages/Exploring-the-Impact-of-Generative-Artificial-Intelligence-\(GAI\)-Tools-on-Education.aspx#1-proper-citations-and-acknowledgements](https://entuedu.sharepoint.com/sites/Student/dept/ctlp/SitePages/Exploring-the-Impact-of-Generative-Artificial-Intelligence-(GAI)-Tools-on-Education.aspx#1-proper-citations-and-acknowledgements)

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