STATE UNIVERSITY OF NEW YORK COLLEGE OF TECHNOLOGY CANTON, NEW YORK



MASTER SYLLABUS

CIVL 313- Highway and Transportation Design

CIP Code: 14.0804

Created by: Adrienne C. Rygel Updated by: Saeid Haji Ghasemali

> School: Canino School of Engineering Technology Department: Civil and Construction Technology Implementation Semester/Year: Fall 2026

- A. TITLE: Highway and Transportation Design
- B. COURSE NUMBER: CIVL 313
- C. CREDIT HOURS (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity):

# Credit Hours per Week	3
# Lecture Hours per Week	2
# Lab Hours per Week	2
Other per Week	

D. WRITING INTENSIVE COURSE:

Yes	
No	х

E. GER CATEGORY:

Does course satisfy a GER category(ies)? If so, please select all that apply.

 [1-2] Communication [3] Diversity: Equity, Inclusion & Social Justice [4] Mathematics & Quantitative Reasoning [5] Natural Science & Scientific Reasoning [6] Humanities 	
 [3] Diversity: Equity, Inclusion & Social Justice [4] Mathematics & Quantitative Reasoning [5] Natural Science & Scientific Reasoning [6] Humanities 	
[4] Mathematics & Quantitative Reasoning[5] Natural Science & Scientific Reasoning[6] Humanities	
[5] Natural Science & Scientific Reasoning [6] Humanities	
[6] Humanities	
[7] Social Sciences	
[8] Arts	
[9] US History & Civic Engagement	
[10] World History & Global Awareness	
[11] World Languages	

F. SEMESTER(S) OFFERED:

Fall	Х
Spring	
Fall and Spring	

G. COURSE DESCRIPTION:

This course covers the design of horizontal and vertical highway alignments in accordance with American Association of State Highway and Transportation Officials (AASHTO) requirements from survey data, topographic maps and traffic data. Analysis of alternate plans using benefit cost ratios based on road user costs and first costs are included. Setting of traffic light timing for optimum traffic flow and design of parking is introduced.

H. PRE-REQUISITES: CONS 101 Elementary Surveying

CO-REQUISITES:

I. STUDENT LEARNING OUTCOMES:

Course Student Learning Outcome [SLO]	Program Student Learning Outcome [PSLO]	GER	ISLO & Subsets
a. Design the horizontal and vertical alignment for a highway	SO 2		ISLO 5
b. Design a pavement for given traffic load and soil conditions	SO 2		ISLO 5
c. Design an at grade intersection	SO 2		ISLO 5
d. Determine the capacity of a section of highway	SO 2		ISLO 2 (PS) and ISLO 5
e. Determine the timing for traffic lights on a section of street	SO 2		ISLO 2 (PS) and ISLO 5
f. Compare the benefits and costs of different modes of transportation	SO 7		ISLO 2 (PS)

KEY	Institutional Student Learning Outcomes
	[ISLO 1 – 5]
ISLO #	ISLO & Subsets
1	Communication Skills
	Oral [O], Written [W]
2	Critical Thinking
	Critical Analysis [CA], Inquiry & Analysis [IA] , Problem Solving [PS]
3	Foundational Skills
	Information Management [IM], Quantitative Lit, /Reasoning [QTR]
4	Social Responsibility
	Ethical Reasoning [ER], Global Learning [GL],
	Intercultural Knowledge [IK], Teamwork [T]
5	Industry, Professional, Discipline Specific Knowledge and Skills

J. APPLIED LEARNING COMPONENT:

Yes	х
No	

If yes, select [X] one or more of the following categories:

Classroom / Lab	х	Community Service	
Internship		Civic Engagement	
Clinical Practicum		Creative Works/Senior Project	
Practicum		Research	
Service Learning		Entrepreneurship [program, class, project]	

K. TEXTS:

Garber, Nicholas J. and Hoel, Lester A. (2008) Traffic and Highway Engineering, 3rd Edition, Pacific Grove, CA: Brooks/Cole Publishing Company. or Mannering, F.L., Or

Washburn, S.S. and Kilareski, W.P (2009) Principles of Highway Engineering and Traffic Analysis, 4th Edition. Wiley

0r

Fricker, J. D. and Whitford, R.K. (2005) Fundamentals of Transportation Engineering: A Multimodal Systems Approach. Pearson

L. REFERENCES:

A Policy on Geometric Design of Highways and Streets, 5th Edition. American Association of State Highway and Transportation Officials

- M. EQUIPMENT:
- N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

Exams Quizzes Design Project(s) Homework Laboratory projects

P. DETAILED COURSE OUTLINE:

- I. Overview of transportation engineering
 - A. The profession of transportation engineering
 - B. Safety considerations
 - C. Environmental and social considerations
 - D. Organizations and administration
 - E. Introduction to travel demand forecasting

- II. Geometric design of highways
 - A. Roadway characteristics and classifications
 - B. Highway design factors
 - C. The physics of vehicular turning and stopping
 - D. Driver reactions and sight considerations
 - E. Vertical alignment
 - F. Horizontal alignment
- III. At grade intersections
 - A. Capacity and level of service determination
 - B. Geometric design
 - C. Traffic control devices
 - D. Introduction to roundabouts
- IV. Pavement design
 - A. Review of soils and materials courses
 - B. Rigid pavement design
 - C. Flexible pavement design
 - D. Measurement of pavement performance
- V. Traffic flow
 - A. General concepts
 - B. Queuing theory
 - C. Capacity and level of service
 - D. Intersection signalization
 - E. Traffic signal timing

Q. LABORATORY OUTLINE:

- 1. Geometric design of highways
- 2. Geometric design
- 3. Pavement design
- 4. Traffic Design