



COURSE OUTLINE: CIV216 - HIGHWAY ENGINEERING

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Approved: Martha Irwin - Dean

Course Code: Title	CIV216: HIGHWAY ENGINEERING
Program Number: Name	4080: CIVIL ENG TECHNICIAN
Department:	CIVIL/CONSTRUCTION
Academic Year:	2025-2026
Course Description:	This course will introduce the student to fundamental concepts in the field of transportation engineering. The student will develop a working knowledge of road classification, level of service, traffic study, highway geometrics and intersection design. Computer and survey applications will be discussed when appropriate.
Total Credits:	4
Hours/Week:	4
Total Hours:	56
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Vocational Learning Outcomes (VLO's) addressed in this course:	4080 - CIVIL ENG TECHNICIAN
Please refer to program web page for a complete listing of program outcomes where applicable.	VLO 4 carry out sustainable practices in accordance with contract documents, industry standards and environmental legislative requirements.
	VLO 7 use industry-specific electronic and digital technologies to support civil engineering projects.
	VLO 8 participate in the design and modeling phase of civil engineering projects by applying engineering concepts, basic technical mathematics and principles of science to the review and production of project plans.
Essential Employability Skills (EES) addressed in this course:	EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.
	EES 3 Execute mathematical operations accurately.
	EES 4 Apply a systematic approach to solve problems.
	EES 5 Use a variety of thinking skills to anticipate and solve problems.
	EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others.
	EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.
	EES 10 Manage the use of time and other resources to complete projects.
	EES 11 Take responsibility for ones own actions, decisions, and consequences.
Course Evaluation:	Passing Grade: 50%, D



	A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.
Other Course Evaluation & Assessment Requirements:	<p>Grade Definition Grade Point Equivalent A+ 90 - 100% 4.00 A 80 - 89% B 70 - 79% 3.00 C 60 - 69% 2.00 D 50 - 59% 1.00 F (Fail)49% and below 0.00</p> <p>CR (Credit)Credit for diploma requirements has been awarded. S Satisfactory achievement in field /clinical placement or non-graded subject area. U Unsatisfactory achievement in field/clinical placement or non-graded subject area. X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course. NR Grade not reported to Registrar's office. W Student has withdrawn from the course without academic penalty.</p>

Course Outcomes and Learning Objectives:	Course Outcome 1	Learning Objectives for Course Outcome 1
	Upon successful completion, the student will be able to: 1. Identify classifications, characteristics and sources of design criteria for streets and highways	1.1 Identify roadway classification systems (e.g., rural vs. urban, arterial vs. collector). 1.2 Distinguish between functional classifications as per MTO and TAC guidelines. 1.3 Interpret and apply relevant municipal, provincial, and federal transportation policies. 1.4 Recognize the purpose of design control elements (e.g., design speed, traffic volume, access type).
	Course Outcome 2	Learning Objectives for Course Outcome 2
	Upon successful completion, the student will be able to: 2. Identify and apply local, regional and national standards and specifications for roads and Highways.	2.1 Determine minimum horizontal radii for road and highway curves utilizing formulas and tables. 2.2 Calculate simple circular and transitional spiral curves to meet design requirement. 2.3 Calculate minimum, maximum and full superelevations for given horizontal alignment. 2.4 Determine maximum and minimum vertical curve lengths and select suitable lengths to meet design requirements for recommended rates of vertical change. Use TAC Geometric Design Guide to determine minimum design parameters. 2.5 Design simple horizontal curves using radius, deflection angles, and chord lengths. 2.6 Calculate grades and vertical curve lengths for crest and sag conditions. 2.7 Develop plan and profile drawings using specified design controls. 2.8 Evaluate the impact of sight distances (stopping, passing) on alignment design.
	Course Outcome 3	Learning Objectives for Course Outcome 3

	Upon successful completion, the student will be able to: 3. Identify utility requirements for proposed street and highway developments and assess their potential environmental impact.	3.1 Identify environmental features that affect route selection (e.g., wetlands, slope stability). 3.2 Recognize typical utility conflicts (e.g., gas, hydro, sewer) in design corridors. 3.3 Apply the principles of context-sensitive design and complete streets. 3.4 Interpret property lines and easements in alignment planning. 3.5 Incorporate basic erosion and sediment control principles in design tasks. 3.6 Recognize and understand the importance of Indigenous participation/engagement.
	Course Outcome 4	Learning Objectives for Course Outcome 4
	Upon successful completion, the student will be able to: 4. Identify, prepare and present design drawings of horizontal and vertical alignments.	4.1 Identify procedures required to conduct environmental impact studies. 4.2 Identify qualitative and quantitative data from environmental studies.
	Course Outcome 5	Learning Objectives for Course Outcome 5
	5. Evaluate and design intersections using capacity analysis, safety criteria, and traffic control methods.	5.1 Compare types of at-grade intersections (e.g., T-intersections, roundabouts, signalized). 5.2 Calculate intersection sight distances based on TAC design tables. 5.3 Perform simple Level of Service (LOS) calculations using volume, delay, and lane data. 5.4 Apply warrants for traffic signals and stop/yield control. 5.5 Develop basic intersection layout drawings with turning radii, tapers, and curb returns.

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Assignments	40%
Final Exam	30%
Mid-Term Exam	30%

Date:

July 31, 2025

Addendum:

Please refer to the course outline addendum on the Learning Management System for further information.

