



COURSE OUTLINE: CAD266 - AUTOCAD CIVIL 3D

Prepared: Marc Pilon, MBA, P.Eng, FEC, C.E.T, PMP

Approved: Martha Irwin - Dean

Course Code: Title	CAD266: AUTOCAD CIVIL 3D APPLICATIONS
Program Number: Name	4080: CIVIL ENG TECHNICIAN
Department:	CIVIL/CONSTRUCTION
Academic Year:	2025-2026
Course Description:	<p>This course will further develop student's skills in AutoCAD, specifically the understanding of applications and proficiency in Civil 3D. AutoCAD Civil 3D is the backbone of Civil Engineering Industry in a variety of sectors (Land development, Municipal Infrastructure, Transportation) and extends the knowledge of 2D AutoCAD, as well as surveying applications.</p> <p>This course will develop skills in Surfaces, Alignment, Corridors, Plan and Profiles, Cuts and Fills, as well as general geometric alignments of roadways and infrastructure. At the completion of this Course, students will be able to develop base drawings in 3D surveyed data, add and modify underground elements (i.e. sewers, watermain, maintenance structures), develop alignments of existing and proposed construction, and determine material quantities.</p>
Total Credits:	3
Hours/Week:	3
Total Hours:	42
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 1 develop and use strategies to enhance professional growth and ongoing learning in the civil engineering field.
	VLO 3 complete duties and assist in monitoring that work is performed in compliance with contractual obligations, applicable laws, standards, bylaws, codes and ethical practices in the civil engineering field.
	VLO 5 collaborate with the project team and communicate effectively with project stakeholders to support civil engineering projects.
	VLO 6 collect, process and interpret technical data to produce written and graphical project-related documents.
	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.
	VLO 9 assist in the scheduling, cost estimation and monitoring of the progression of civil engineering projects by applying principles of construction project management.
	VLO 11 apply teamwork, leadership and interpersonal skills when working individually or



	within multidisciplinary teams to complete civil engineering projects.	
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 6	Locate, select, organize, and document information using appropriate technology and information systems.
	EES 7	Analyze, evaluate, and apply relevant information from a variety of sources.
	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 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> <p>Attendance Students are only allowed to miss three classes without a documented explanation. One mark will be deducted from your overall grade for each undocumented explanation. The maximum deduction in overall grade is not to exceed 15%. Valid documented explanation include:</p> <ul style="list-style-type: none"> • Medical reason • Family emergency • Child care issue • Transportation problems • And any other reasonable explanation <p>The documented explanation has to be sent to the course professor by e-mail no later than three days from a missed class. A Doctor note, etc., is to be attached as a PDF file to your e-mail.</p>	
Course Outcomes and Learning Objectives:	Course Outcome 1	Learning Objectives for Course Outcome 1

	<p>1) Apply appropriate mathematical, technical, and AutoCAD Civil 3D software skills to design and model components of civil infrastructure projects, including horizontal and vertical geometry.</p>	<p>1.1 Use Civil 3D toolspaces and settings to set up a working project environment using appropriate templates and drawing scales. 1.2 Create horizontal alignments using both from objects and by layout methods, applying design controls such as tangents, curves, and stationing. 1.3 Apply and modify alignment labels and styles to display geometric properties such as PI stations, curve radii, and design speeds. 1.4 Generate surface-based profiles from existing ground data and draw finished grade profiles using layout tools and PVI editing. 1.5 Assign profile styles and labels to show slopes, elevations, stationing, and design grades clearly on profile views. 1.6 Use mathematical and design inputs (e.g., grades, curve lengths, elevations) to model road geometry consistent with engineering design standards. 1.7 Troubleshoot geometric constraints such as overlapping tangents, abrupt grade changes, or misaligned baseline conditions. 1.8 Compare design alternatives by modifying alignments and profiles and regenerating associated views.</p>
	<p>Course Outcome 2</p>	<p>Learning Objectives for Course Outcome 2</p>
	<p>2) The graduate has reliably demonstrated the ability to complete duties and assist in monitoring that work is performed in compliance with contractual obligations, applicable laws, standards, bylaws, codes and ethical practices in the civil engineering field.</p>	<p>2.1 Import and manage survey point files and surfaces (e.g., .csv, .xml, or .tin) within Civil 3D to establish existing ground conditions. 2.2 Analyze surface data using spot elevations, contours, and slope arrows to identify critical features such as low points and high points. 2.3 Create alignments and profiles based on surveyed data to reflect existing roadways, pipes, or terrain conditions. 2.4 Extract elevation and grade data from surfaces to inform pipe network and corridor layout. 2.5 Use Civil 3D tools (such as inquiry tools, profile view bands, and object labels) to verify surveyed and design elevations. 2.6 Generate and interpret surface profiles to assess existing drainage patterns and grading issues. 2.7 Establish appropriate baseline and profile starting points using field-derived or provided surveyed geometry. 2.8 Compare proposed designs against existing conditions, highlighting cut/fill or pipe depth implications based on survey-derived surfaces.</p>
	<p>Course Outcome 3</p>	<p>Learning Objectives for Course Outcome 3</p>
	<p>3) The graduate has reliably demonstrated the ability to collaborate with the project team and communicate effectively with project stakeholders to support civil engineering projects.</p>	<p>3.1 Apply and customize Civil 3D label styles for alignments, profiles, pipe networks, and corridor components to convey engineering data effectively. 3.2 Annotate profile and plan views with key data such as elevations, slopes, pipe sizes, and stationing using Civil 3D band styles. 3.3 Use annotation scaling and viewports to maintain legibility</p>



	<p>and consistency across model space and paper space.</p> <p>3.4 Create and organize plan and profile sheets using the Civil 3D Sheet Set Manager or plan production tools.</p> <p>3.5 Generate cross-sections with appropriate labeling for cut/fill areas, material boundaries, and surface comparisons.</p> <p>3.6 Insert and format tables (e.g., pipe structure tables, alignment tables) to present model data in tabular form suitable for submission.</p> <p>3.7 Follow industry conventions (e.g., north arrows, scales, title blocks, drawing numbers) when preparing final drawing packages.</p> <p>3.8 Export drawings to PDF or DWG formats for digital distribution, ensuring that all annotations and layers meet professional standards.</p>
Course Outcome 4	Learning Objectives for Course Outcome 4
4) The graduate has reliably demonstrated the ability to collect, process and interpret technical data to produce written and graphical project-related documents.	<p>4.1 Reference Ontario Provincial Standards (OPSD/OPSS) to guide the layout of storm, sanitary, and watermain systems in pipe networks.</p> <p>4.2 Apply MTO design parameters (e.g., minimum curve radii, grades, and design speeds) when laying out horizontal and vertical alignments.</p> <p>4.3 Use MECP guidelines for pipe sizing and slope requirements in sewer and watermain design.</p> <p>4.4 Select appropriate pipe materials, structures, and fittings based on local municipal standards and Civil 3D parts lists.</p> <p>4.4 Modify design rules and pipe network settings in Civil 3D to ensure compliance with municipal by-laws and engineering design criteria.</p> <p>4.5 Integrate minimum cover, clearance, and slope requirements into profile designs of storm and sanitary pipes.</p> <p>4.6 Check designs against clearance envelopes, outlet elevations, and roadway constraints to ensure they meet regulatory guidelines.</p> <p>4.7 Document conformance with standards through properly styled labels, annotations, and submission-ready drawing outputs.</p>
Course Outcome 5	Learning Objectives for Course Outcome 5
5) Use AutoCAD Civil 3D to model, annotate, and analyze civil engineering components including alignments, profiles, corridors, and pipe networks.	<p>5.1 Create and manage alignments from objects and by layout.</p> <p>5.2 Generate profiles from surfaces and create layout profiles.</p> <p>5.3 Assign and customize profile and alignment labels and styles.</p> <p>5.4 Create and edit assemblies and corridor models.</p> <p>5.5 Manage corridor baselines, frequencies, and targets.</p> <p>5.6 Generate corridor surfaces and split corridors for staging.</p> <p>5.7 Design pipe networks using creation tools and from existing objects.</p> <p>5.8 Modify pipe networks using parts lists, rules, and profile projections.</p>
Course Outcome 6	Learning Objectives for Course Outcome 6

	6) Apply AutoCAD Civil 3D tools to simulate and evaluate the geometric and hydraulic performance of civil infrastructure projects.	6.1 Develop cross-sections and compute cut/fill quantities using Civil 3D corridors. 6.2 Integrate storm sewer systems into civil site models. 6.3 Project pipe networks into profile views and analyze invert relationships. 6.4 Apply styles and labels to Civil 3D elements for construction documentation. 6.5 Extract material takeoffs and perform quantity calculations.								
Evaluation Process and Grading System:	<table border="1"> <thead> <tr> <th data-bbox="492 352 686 404">Evaluation Type</th> <th data-bbox="686 352 898 404">Evaluation Weight</th> </tr> </thead> <tbody> <tr> <td data-bbox="492 404 686 439">Assignments (3)</td> <td data-bbox="686 404 898 439">30%</td> </tr> <tr> <td data-bbox="492 439 686 473">Design Project</td> <td data-bbox="686 439 898 473">40%</td> </tr> <tr> <td data-bbox="492 473 686 508">Theory Tests (3)</td> <td data-bbox="686 473 898 508">30%</td> </tr> </tbody> </table>		Evaluation Type	Evaluation Weight	Assignments (3)	30%	Design Project	40%	Theory Tests (3)	30%
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Assignments (3)	30%									
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Date:	July 31, 2025									
Addendum:	Please refer to the course outline addendum on the Learning Management System for further information.									