



## COURSE OUTLINE: CAD222 - APPLIED CAD II

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Approved: Martha Irwin - Dean

<b>Course Code: Title</b>	CAD222: APPLIED CAD II
<b>Program Number: Name</b>	4080: CIVIL ENG TECHNICIAN
<b>Department:</b>	CIVIL/CONSTRUCTION
<b>Academic Year:</b>	2025-2026
<b>Course Description:</b>	<p>This course is intended to expand on the basic skills developed from other introductory CAD courses. Students should have as a prerequisite, CAD100 or CAD120 or equal industrial experience. The student will learn how use advanced Civil 3D features such as 3D modeling (including wire frames, surfaces and solids), rendering, dynamic blocks and interface customization.</p> <p>Students will also use BIM (Building Information Modeling) software to create a structural model. The model will be used to further create structural details and related construction document components such as schedules and material quantity estimates.</p>
<b>Total Credits:</b>	3
<b>Hours/Week:</b>	3
<b>Total Hours:</b>	42
<b>Prerequisites:</b>	CAD100
<b>Corequisites:</b>	There are no co-requisites for this course.
<b>Vocational Learning Outcomes (VLO's) addressed in this course:</b>	<b>4080 - CIVIL ENG TECHNICIAN</b>
<b>Please refer to program web page for a complete listing of program outcomes where applicable.</b>	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.
<b>Essential Employability Skills (EES) addressed in this course:</b>	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 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 10 Manage the use of time and other resources to complete projects. EES 11 Take responsibility for ones own actions, decisions, and consequences.
<b>Course Evaluation:</b>	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:**

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.

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:

- Medical reason
- Family emergency
- Child care issue
- Transportation problems
- And any other reasonable explanation

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.

**Course Outcomes and Learning Objectives:**

Course Outcome 1	Learning Objectives for Course Outcome 1
Upon successful completion, the student will be able to: 1. Collect, process and interpret technical data to produce written and graphical project-related documents	1.1 Select and use appropriate technologies to produce documents for civil engineering projects. 1.2 Present civil engineering data to stakeholders. 1.3 Use relevant information to construct models for civil engineering projects by using drawings and computer assisted technologies.
Course Outcome 2	Learning Objectives for Course Outcome 2
Upon successful completion, the student will be able to: 2. Use industry-specific electronic and digital technologies to support civil	2.1 Keep abreast of changes in technology that affect civil engineering. 2.2 Identify the impact and application of technology throughout the lifecycle of civil engineering projects, i.e., field data collection, design and engineering, estimating and

engineering projects.

construction.

2.3 Select and use industry specific electronic and digital technologies to design projects, produce plans and to solve project related problems (e.g., Computer Aided Design (CAD), Building Information Modeling (BIM), etc.)

2.4 Visualize, manipulate and analyze spatial data using a variety of data sources and technologies.

2.5 Use AutoCAD to generate and edit 3D wireframes, solids, and renderings

2.6 Use Revit Structure to model structural framing and foundations

2.7 Generate quantity take-offs and schedules from BIM models

2.8 Complete the following functions on existing or new drawings:

Customizing AutoCAD

- Customizing the user interface

- Creating toolbars and basic macros

Blocks and Attributes

- Create blocks and assign attributes

- Edit attributes

- Assigning attributes as fields

- Extract attributes to tables

- Create dynamic blocks incorporating action parameters

- Use look-up tables in dynamic blocks

AutoCAD in Three Dimensions

- Understanding and Manipulating the UCS

- Using model space viewports

- Drawing wireframe models using coordinate and polar input

- Creating surface models and meshes

- Creating solids and solid Boolean operations

- Editing solids

Materials and Rendering

- Manipulate drawing display in model space and floating viewports

- Change the drawing display type

- Apply and customize the render command

- Apply materials to 3D objects

- Apply lighting to rendered scenes

- Save and export rendered images

- Create parallel line and perspective views of 3D geometry

Introduction to Building Information Modeling

- Define BIM and distinguish from CAD

- Discuss the concept of smart objects and parametric modeling

- Open and create a project using BIM software

- Save a BIM project

- Describe the organization of libraries and families in BIM



	<ul style="list-style-type: none"> <li>Setup a BIM Structures Project</li> <li>-Create a structural grid layout from a given drawing</li> <li>-Adjust the annotation of the structural grid</li> <li>-Create and edit levels in BIM</li> <li>-Manipulate the level annotations</li> <li>-Identify and create views</li> <li>-Add dimensions to structural plans</li> <li>- Understand adding steel and concrete elements.</li> </ul> <p>Civil 3D</p> <ul style="list-style-type: none"> <li>Creating Templates</li> <li>Creating Label Styles</li> <li>Description Keys</li> <li>Introduction to Surfaces</li> <li>Creating and defining surfaces by point groups</li> <li>Defining a surface from break lines</li> <li>Defining a surface Boundary</li> <li>Defining a surface by Edits</li> <li>Defining a surface from Contours</li> <li>Surface Properties</li> <li>Analysis by Water Drop Path</li> <li>Volume Surfaces (Cut and Fill)</li> <li>Surface Styles</li> </ul>				
	<table border="1"> <tr> <td><b>Course Outcome 3</b></td> <td><b>Learning Objectives for Course Outcome 3</b></td> </tr> <tr> <td> <p>Upon successful completion, the student will be able to:</p> <p>3. 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.</p> </td> <td> <p>3.1 Review the technical criteria used in the design, layout and construction of civil engineering projects.</p> </td> </tr> </table>	<b>Course Outcome 3</b>	<b>Learning Objectives for Course Outcome 3</b>	<p>Upon successful completion, the student will be able to:</p> <p>3. 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.</p>	<p>3.1 Review the technical criteria used in the design, layout and construction of civil engineering projects.</p>
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**Evaluation Process and Grading System:**

Evaluation Type	Evaluation Weight
Final Test	25%
Laboratory/Assignments	50%
Mid-Term Test	25%

**Date:** July 31, 2025

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