DDGT-110: TECHNICAL DRAWING FUNDAMENTALS

Effective Term
Fall 2026

CC Approval
10/03/2025

AS Approval
10/09/2025

BOT Approval
10/16/2025

COCI Approval
12/12/2025

SECTION A - Course Data Elements

CB04 Credit Status
Credit - Degree Applicable

Discipline

Minimum Qualifications	And/Or
Drafting/CADD (Computer Aided Drafting/Design) (Any Degree and Professional Experience)	

Subject Code
DDGT - Digital Design Graphics Technology
Course Number
110

Department
Digital Design Graphics Technology

Division
Career Education and Workforce Development (CEWD)

Full Course Title
Technical Drawing Fundamentals

Short Title
Technical Drawing Fundamentals

CB03 TOP Code
0953.00 - *Drafting Technology

CIP Code
15.1301

CB08 Basic Skills Status
NBS - Not Basic Skills

CB09 SAM Code
D - Possibly Occupational

Rationale
CTE course review per Title V requirement.

SECTION B - Course Description

Catalog Course Description

An entry-level course for students with little or no technical drawing experience. Topics covered include national and international drafting standards, drawing scales, two-dimensional geometric construction, orthographic projection, auxiliary views, sectioning, dimensioning, creation and modification of basic templates, and computer-aided drafting (CAD) using the latest version of Autodesk AutoCAD software.

SECTION C - Conditions on Enrollment

Open Entry/Open Exit

No

Repeatability

Not Repeatable

Grading Options

Letter Grade or Pass/No Pass

Allow Audit

Yes

Requisites

SECTION D - Course Standards

Is this course variable unit?

No

Units

3.00

Lecture Hours

36.00

Lab Hours

54.00

Outside of Class Hours

72

Total Contact Hours

90

Total Student Hours

162

Distance Education Approval

Is this course offered through Distance Education?

Yes

Online Delivery Methods

DE Modalities	Permanent or Emergency Only?
Entirely Online	Permanent
Hybrid	Permanent
Online with Proctored Exams	Permanent

SECTION E - Course Content

Student Learning Outcomes

	Upon satisfactory completion of the course, students will be able to:
1.	Demonstrate proficiency with AutoCAD tools and commands to earn an Autodesk Certificate of Training.
2.	Produce industry-standard working drawings using current Autodesk AutoCAD software, applying appropriate technical drafting conventions and design standards.

Course Objectives

	Upon satisfactory completion of the course, students will be able to:
1.	Utilize American National Standards Institute (ANSI) and International Standards Organization (ISO) drafting standards.
2.	Effectively utilize engineering, architecture, and metric scales.
3.	Understand the components of a CAD workstation.
4.	Effectively use the latest release of the AutoCAD software program in a two-dimensional workspace.
5.	Utilize drawing aids for entity accuracy.
6.	Perform various geometric constructions.
7.	Construct and edit two-dimensional CAD drawing entities.
8.	Effectively utilize multiple layers.
9.	Construct multi-view drawings utilizing orthographic projection.
10.	Utilize auxiliary view techniques.
11.	Utilize sectioning techniques.
12.	Represent various fasteners.
13.	Create and modify simplified custom templates to industry standards.
14.	Correctly dimension working detail drawings.
15.	Place and edit detail drawing annotations.
16.	Print hard copies of two-dimensional detail drawings.
17.	Perform efficient Computer-Aided Drafting (CAD) related file management techniques.
18.	Utilize the Windows operating system.

Course Content

1. Design Visualization
    a. Drawing Types
    b. Image Planes
    c. Design Process
    d. Advantages of Prototyping
    e. Advantages of 3D Renderings and Conceptualization
    f. Types of Views: Oblique, Isometric, and Perspective
    g. Types of Sketches: Technical, Artistic, Working Drawings
2. CAD Workstation Components
    a. Computer Hardware: CPU, Motherboards, Memory, Hard Drives, Video Cards, Power Supplies, ROM
    b. Computer Software: Operating Systems, GUI
    c. Input and Output Devices: Monitors, Keyboards, Mice, 3D Mice, Tablets, Digitizers, Printers, Scanners
    d. Storage Devices: Flash Drives, Servers, NAS, Raid Types
3. Technical Drawing Tools
    a. Typical Hand Drafting Tools: T-Squares, Triangles, Drafting Machines, Parallel Arms, Protractors, Erasing Shields, French Curves, Splines, Compasses, and Templates
    b. Hand Drafting Best Practices
    c. How to Use and Read Scales: Architectural, Engineering, and Metric
4. ANSI and ISO Standards
    a. Line Weights
    b. Line Types – Alphabet of Lines and Precedence of Lines
    c. Paper Sizes
    d. Text Heights, Standards, and Applications
5. Engineering Geometry and Construction

a. 2D Coordinate and 3D Coordinate Systems
b. Absolute vs. Relative Coordinates
c. World Coordinate System vs. Local Coordinate Systems
d. Geometric Terms: Points, Lines, Parallel, Perpendicular, Intersections, Tangency, Circle Definitions, Concentric, Eccentric, Inscribed, Circumscribed, Classification of Angles, Classification of Quadrilaterals, Polygons, Regular Polygons, Classification of Triangles
e. Standard Drafting Constructions: How to Bisect a Line, How to Bisect an Angle, How to Find the Center of a Radius, How to Find the Center of a Cir cle

6. Multiview Drawings
   a. Orthographic Projection and Best Practices
   b. U.S. Standard Third Angle Projection vs. ISO Standard First Angle Projection
   c. Glass Box Method, Plane of Projection, Six Principle Views and the Number of Views Actually Needed
   d. General Layout, Construction Lines, Miter Lines
   e. Representations of Various Types of Machines Holes
   f. Representations of Fillets and Chamfers
7. Auxiliary Views
   a. Descriptions and Applications
   b. Inclined Planes and Oblique Planes
   c. Auxiliary View Classifications: Primary, Secondary, Tertiary
   d. Partial Auxiliary Views vs. Full Auxiliary Views
8. Dimensioning
   a. Dimensioning Terminology, Standards, Applications, Symbology
   b. Size and Location
   c. Types of Dimensioning: Datums, Chain, Baseline, Coordinate
   d. Screw threads and fastener representation
   e. Dual Dimensioning vs. Double Dimensioning
   f. Dimensioning Guidelines
9. Section Views
   a. Definitions and Applications,
   b. Cutting Planes vs. Viewing Planes
   c. Dimension Placement, Alignment, Offset Distances
   d. How to Dimension Standard Hole Types
   e. Standard Protocol: Linetypes, Lineweight, Labels, Hatching, Omitting Lines, How to Deal With Standard Hardware, How to Section Thin and Thick Parts
   f. Types of Sections: Full, Half, Broken, Revolved, Removed, Offset, Assembly, Auxiliary
   g. True Sections vs. Preferred Sections
10. Tolerancing Practices for Both ANSI and ISO
    a. Tolerancing Terminology and Applications
    b. How to Properly Apply Tolerances
    c. Classification of Fits
    d. Tolerance Stack-Up
    e. Surface Symbols
11. AutoCAD Fundamentals
    a. User Interface
    b. 2D Cartesian Coordinate System
    c. Basic Drawing and Editing Commands
    d. Drawing Precision
    e. Object Modification
    f. Layer Management
    g. Advanced Object Types
    h. Analyzing Model and Object Properties
    i. Advanced Editing Commands
    j. Inserting Blocks
    k. Layouts and Printing
    l. Text and Tables
    m. Hatching
    n. Adding Dimensions
    o. Working Effectively With AutoCAD

p. Accurate Positioning
q. Parametric Drawing
r. Working With Blocks
s. Creating Templates
t. Advanced Layouts
u. Annotation Styles
v. External References

Methods of Instruction

Methods of Instruction

Types	Examples of learning activities
Activity	Hands-on creation of 2D CAD drawings, beginning with simple geometric constructions and progressing to complete working drawings.
Lab	Application of drafting standards to student projects with iterative feedback from the instructor.
Lecture	Instructor lectures on assigned readings following industry standards and on Autodesk approved courseware.
Observation and Demonstration	Instructor provides computer demonstrations of best practices utilizing the class software for given assignments.
Projects	Completion of industry-simulated projects that require interpreting design specifications and producing accurate, standards-compliant technical drawings.
Other	Class lectures and demonstrations are recorded and posted online as a student resource.

Online Adaptation

Types	Examples of learning activities
Activity	Students complete interactive CAD exercises in AutoCAD using provided step-by-step tutorials.
Directed Study	Students research ANSI and ISO drafting standards and apply them to a sample drawing project.
Discussion	Students participate in online forums.
Lecture	Recorded demonstrations of CAD techniques with embedded quizzes to check understanding.

Instructor-Initiated Online Contact Types

Announcements/Bulletin Boards
Chat Rooms
Discussion Boards
E-mail Communication
Telephone Conversations
Video or Teleconferencing

Student-Initiated Online Contact Types

Chat Rooms
Discussions
Group Work

Course design is accessible

Yes

Methods of Evaluation

Methods of Evaluation

Types	Examples of classroom assessments
Quizzes	Written exams and quizzes will be given to test student knowledge on software and technical skills. Exams and quizzes will contain short answer, multiple choice, and true and false.

Class Participation	Students are required to submit reading participation assignments answering questions based on the reading prior to the lecture reviewing the material.
Work Assessments	Students may have lab time available during class to work on their homework.
Homework	Homework can be found on the assignment list handed out on the first day of class or on the department website. Homework assignments will be submitted either digitally or printed. Homework assignments will demonstrate the student's ability to successfully utilize the software and demonstrate the student's skill set.
Exams/Tests	Final Exam will be cumulative.

Assignments

Reading Assignments

There will be multiple reading assignments out of the class textbook that coincide with the Ascent courseware instruction. Topics may include design visualization, technical drawing tools, sketching and text, engineering geometry and construction, Multiview drawings, auxiliary views, section views, and dimensioning and tolerancing practices.

Usage of Autodesk approved courseware is required under the terms of the Autodesk Training Center agreement. Reading assignments are contained in each individual section of the Autodesk approved courseware licensed from Ascent.

Writing Assignments

Students will be given multiple reading participation assignments for assigned chapters out of the class textbook. Question types will vary but the answers will be available in the reading. Students are to submit their written assignments at the beginning of the class the day that chapter is reviewed.

Outside-of-Class Assignments

Students will create a series of drawing files for digital submission or for hard copy printed submission. The assignments will vary in complexity ranging from a simple single view to the printing of working drawings.

Critical thinking to solve drafting problems in CAD.

SECTION F - Textbooks and Instructional Materials

Material Type

Textbook

Author

Bertoline, G.,R., Wiebe, E.,N., Hartman, N.,W., Ross, W.,A.

Title

Technical Graphics Communication

Edition/Version

5th

Publisher

McGraw-Hill

Year

2022

Material Type

Other required materials/supplies

Description

Software #1:
Title: AutoCAD
Publisher: Autodesk
Edition: Latest

Material Type

Other required materials/supplies

Description

1. 3" binder or two 1.5" binders.
2. USB flash drive.
3. Headphones

SECTION G - Diversity, Equity and Inclusivity

How does your course and/or course outline of record reflect strategies for accommodating and engaging diverse student populations, advancing equitable outcomes, and fostering inclusion for all students?

This course is taught in a high-flex format, allowing students to participate in person, online, or through a combination of both, providing flexibility for diverse learning needs and personal circumstances. Multiple instructional methods, such as live demonstrations, recorded lectures, guided practice, and hands-on lab activities, ensure accessibility for varied learning styles and abilities. Students are introduced to both national (ANSI) and international (ISO) drafting standards, offering a global perspective and encouraging cultural awareness in technical drawing practices.

Course Codes (Admin Only)

CB00 State ID

CCC000270162

CB10 Cooperative Work Experience Status

N - Is Not Part of a Cooperative Work Experience Education Program

CB11 Course Classification Status

Y - Credit Course

CB13 Special Class Status

N - The Course is Not an Approved Special Class

CB23 Funding Agency Category

Y - Not Applicable (Funding Not Used)

CB24 Program Course Status

Program Applicable

Allow Pass/No Pass

Yes

Only Pass/No Pass

No