DESIGN AND ENGINEERING TECHNOLOGY

CERTIFICATE – 24 CREDITS

About this program

The Design and Engineering Technology program prepares students for employment in a wide variety of engineering-related disciplines. Students are trained across multiple two-dimensional and three-dimensional software platforms to generate drawings of parts, assemblies and layouts, as well as other manufacturing and construction-related documentation specifically required by employers. The curriculum incorporates 3D printing, 3D scanning and rapid prototyping as tools for taking student designs from computer models to three-dimensional solids. Graduates of the program are prepared to enter the workforce as mechanical drafters and designers.

Program outcomes

1. Produce and interpret engineering drawings and models using multiple software packages and various design methodologies, including two-dimensional layouts, three-dimensional layouts and designs, and three-dimensional printed solid models.
2. Effectively communicate in a professional manner graphically, orally and with written communication skills.
3. Perform the math required to accurately calculate scales, parameters, and necessary formulas for communicating and documenting design concepts.
4. Apply critical thinking concepts to identify and solve design concerns for industry-specific projects.

Curriculum overview

Crds	Requirement type
21	Required courses
3	Restricted electives in courses
24	**Total**

Developmental courses note: A student may be required to enroll in developmental courses in reading, writing and math. A student's scores on the Accuplacer assessment will determine enrollment in developmental courses. The purpose of developmental courses is to prepare students for the demands of a college-level curriculum. *Credits may vary.*

Accreditation: Minnesota State Community and Technical College is accredited by the Higher Learning Commission, a regional accreditation agency recognized by the U.S. Department of Education. The Higher Learning Commission 230 South LaSalle Street, Suite 7-500 Chicago, IL 60604-1411 http://www.ncahigherlearningcommission.org Phone: 312.263.0456 / 800.621.7440

Curriculum requirement details

Required courses

Course	Crds
DET1104 - Mechanical Drawing I	4
DET1105 - Mechanical Drawing II	4
DET1204 - Mechanical Drawing III	4
DET1210 - Introduction to Parametric Modeling	4
DET1230 - Introduction to 3D Printing and Scanning	2
ENGT1134 - Office Systems and Equipment	3

Other requirements or restricted electives

3 credits from one or more of these Courses:

Course title	Credits
COMM1120 - Introduction to Public Speaking	3
ENGL1101 - College Writing	3

Course summaries

DET1104 - Mechanical Drawing I ..... ***(4 credits)***
The objective of this course is to develop students' knowledge and use of machine and mechanical drafting, lettering practices, line identity and application, orthographic projection, dimensioning practices, and detail, section and auxiliary drawings.

DET1105 - Mechanical Drawing II ..... ***(4 credits)***
In this course, students utilize design software and descriptive geometry to create, modify, detail and print orthographic, section, detail and auxiliary views. Industry standards will be incorporated into the design process, focusing on accurate view representation, dimensioning and annotation practices.

Prerequisites:

- DET1104

DET1204 - Mechanical Drawing III ..... ***(4 credits)***
The objective of this course is to develop students' use and knowledge of mechanical fasteners and welding symbols, their proper application on weldment drawings, and documentation of assemblies and sub-assemblies. Students also develop an understanding of tolerancing types and rules, including fundamental knowledge of geometric dimensioning and tolerancing symbols, datums and material conditions.

Prerequisites:

- DET1104
- DET1106

DET1210 - Introduction to Parametric Modeling ..... ***(4 credits)***
This course introduces students to part modeling and drawing layout tools in various parametric design software. Students learn concepts of parametric sketching and modeling, sketched feature creation and editing, placed feature creation and editing, and model-derived drawing layouts.

Prerequisites:

- DET1106

DET1230 - Introduction to 3D Printing and Scanning ..... ***(2 credits)***
This course covers basic concepts of 3D printing and rapid prototyping, utilizing various three-dimensional printers, scanners and slicing software.

ENGT1134 - Office Systems and Equipment ..... ***(3 credits)***
This course covers the application of Windows software systems in coordination with AutoCAD software as well as general office equipment set-up and use.

COMM1120 - Introduction to Public Speaking ..... ***(3 credits)***
Meets MnTC Goal Area 1. This course clarifies the process of oral communication, clarifies the basic principles of public speaking and allows the student to increase the application of these principles while both speaking and listening.

ENGL1101 - College Writing ..... ***(3 credits)***
Meets MnTC Goal Area 1. This is an introductory course designed to prepare students for later college and career writing through a process approach with particular emphasis on revision. Students consider purpose and audience as they read, discuss and refine their work to develop confidence in their writing and communication skills.

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Program Plan — "Wadena Certificate"

Locations: Wadena

1st Fall Term (11 credits)

Courses

Course	Crds
DET1104 - Mechanical Drawing I	4
DET1105 - Mechanical Drawing II	4
ENGT1134 - Office Systems and Equipment	3

1st Spring Term (13 credits)

Courses

Course	Crds
DET1204 - Mechanical Drawing III	4
DET1210 - Introduction to Parametric Modeling	4
DET1230 - Introduction to 3D Printing and Scanning	2

3 credits in one or more of the following:

COMM1120 - Introduction to Public Speaking 3
ENGL1101 - College Writing 3