

Program Overview

Mechanical Design Technicians use computer (CAD) skills with mathematics, physics, and manufacturing technology to develop assemblies of machine parts and products for 3D working models. Students explore principles of mechanical design through hands-on experience. We utilize state-of-the-art equipment to design and model machine parts, mechanical assemblies, and innovative new products.

Offered at:

Rice Lake



Student Profile

As a Mechanical Design Technology student, you should be able to:

- Apply mathematical, mechanical, scientific, and technical principles
- Concentrate on details for a long time
- Visualize shapes and forms from prints and sketches
- Handle and manipulate precision-measuring instruments
- Follow instructions carefully
- Work under pressure of deadlines
- Work under supervision
- Assume responsibility for work
- Be able to work at a computer for long periods
- Think creatively

Preparation for Admission

The following experiences will help you prepare for this program:

- Geometry
- Algebra
- Physics
- Machine Shop
- Print Reading
- Chemistry
- Mechanical Drawing
- English/Communications
- Keyboarding
- Computer classes

Program Outcomes

Employers will expect you, as a Mechanical Design Technology graduate, to be able to:

- Translate engineering terms and symbols into product and machine dimensions, tolerances, parts, and processes.
- Develop skills in design, 3D modeling, and computer drafting.
- Use knowledge of manufacturing processes to develop a mechanical machine or product.
- Apply mathematics and physics to machine design and development.
- Visualize solutions and new machine and product innovations.

Career Outlook

After graduating from the Mechanical Design Technology program, you will be ready to start your career as a(n):

- Mechanical Design Technician
- Engineering Technician
- CAD/CAM Technician
- Draftsperson, Mechanical
- Tool Programmer
- Numerical Control Programmer
- Engineering Assistant
- Mechanical Equipment Designer
- Die Designer
- Tool Designer
- 3D Solid Modeler

Curriculum

Number	Course Title	Credits
Technical Studies Courses		
10606102	Engineering Procedures and Specifications	4
10606111	Mechanisms [▲]	3
10606120	Manufacturing Processes	3
10606125	Hydraulics/Pneumatics/Fluidics	2
10606140	Mechanical CAD	4
10606141	Advanced Mechanical CAD [▲]	5
10606143	Engineering/Computer Drafting [▲]	5
10606148	Elements of Solid Modeling [▲]	2
10606151	Strength of Materials [▲]	3
10606155	Design/Machine Elements [▲]	4
10606159	Machine Design Problems (WBL)	4
10623175	Geometric Dimensioning and Tolerancing	<u>2</u>
		41
General Studies Courses		
10801195	Written Communication [♦]	3
10801196	Oral/Interpersonal Communication or	
10801198	Speech	3
10804113	College Technical Mathematics 1A	3
10804114	College Technical Mathematics 1B [▲]	2
10804116	College Technical Mathematics 2 [▲]	4
10806154	General Physics 1 [▲]	4
10809144	Macroeconomics	3
10809172	Race, Ethnic, and Diversity Studies	3
10809198	Introduction to Psychology or	3
10809199	Psychology of Human Relations	<u>3</u>
		28
	PROGRAM REQUIREMENTS	69

[▲] This course requires a prerequisite and/or corequisite, and must be completed with a grade of "C-" or better.

[♦] Appropriate placement score or Introduction to College Writing course required.

Course Descriptions

10606102

Engineering Procedures and Specifications - Credits: 4

This is a course using engineering procedures and visualization skills to solve problems. Print reading skills will be learned using detail and assembly drawings. The use of scales and measuring tools will be learned by the student. Sketching and projection of isometric and multiviews will be used to solve visualization problems. The placement of dimensions, notes, and engineering specifications are interpreted for reading prints. AutoCAD computer skills will be applied for the projection of surfaces and views.

10606111

Mechanisms - Credits: 3

This course is a study of existing mechanisms and their motion characteristics, with emphasis on the application of this study to the design of mechanisms to provide predetermined motion characteristics. The course also concentrates on the graphical solution to problems in cam and gear development, four-bar, and other mechanisms. It includes representation of parts using auxiliary views, sectional views, thread specifications, and fasteners. PREREQUISITE: 10606141 Advanced Mechanical CAD.

10606120

Manufacturing Processes - Credits: 3

A study of the primary manufacturing processes involved in the production of metallic and/or plastic parts. Included are casting, forging, powder metallurgy, hot and cold working, and heat treatment. The student becomes familiar with properties and production methods of common engineering metals, both ferrous and nonferrous. In addition, five to seven field trips will be taken during class time to area manufacturers using the processes studied in the coursework.

10606125

Hydraulics/Pneumatics/Fluidics - Credits: 2

This course is a study of principles involved in the use of air and liquids to do work. It serves as an introduction to the theory related to the basic laws of fluid power. Emphasis is placed on learning the various componentry that controls and directs fluid, the development of basic pneumatic circuits, and hydraulic system design. The course includes hands-on laboratory exercises and the problem-solving approach.

10606140

Mechanical CAD - Credits: 4

This course is an introduction to the graphical representation of mechanical components. The student becomes familiar with the personal computer, hardware, and software used in an engineering office in the mechanical design field. Visualization, sketching, projection, dimensioning, and other beginning skills necessary in this area are studied.

10606141

Advanced Mechanical CAD - Credits: 5

This is an advanced course that emphasizes the computer drafting techniques and skills necessary for technical industry. The content covers concepts of dimensioning and tolerancing, detail and assembly drawings, the design process, and editing and dimensioning working drawings for mass production. PREREQUISITE: 10606140 Mechanical CAD.

10606143

Engineering/Computer Drafting - Credits: 5

This course begins with tolerancing analysis, basic hole systems, and geometric true position tolerances. A large portion of this class is devoted to the development of a complete set of working drawings. Students will use precision measuring instruments on actual parts to complete detail, assembly, and 3D drawings. The purpose and format of a bill of material will be explored. Students work as a design team the last two weeks of the semester to complete a tool design problem using standard materials and hardware. Drawings are developed on a computer-aided design (CAD) workstation. PREREQUISITE: 10606141 Advanced Mechanical CAD.

10606148

Elements of Solid Modeling - Credits: 2

This course introduces students to solid modeling objects and the tools to create and manipulate fully parametric three-dimensional parts and assemblies using a 3-D mechanical design software program. Credit A activities include developing a CAD drafting plan, identifying CAD components, creating sketches, extruding solids, and modifying sketches and extruded features. Credit B activities include creating constraints and relationships, symmetrical features, templates, drawing layouts, and assemblies. PREREQUISITE: 10606140 Mechanical CAD.

10606151

Strength of Materials - Credits: 3

This course will consist of lecture and lab exercises. The course content encompasses analysis of force systems with a particular emphasis on free body diagrams. Students will use algebra and trigonometry to calculate tension, compression, shear and bearing stresses in mechanical applications. In addition, students will determine torque and horsepower using formulas from the textbook and Machinist's Handbook. Students use a tensile tester for destructive testing of aluminum specimens, then create a spreadsheet to determine stress points via graphing. In addition, CAD software is used to diagram and solve for forces on pinned, bolted, and welded specimens. PREREQUISITE: 10804116 College Technical Mathematics 2.

10606155

Design/Machine Elements - Credits: 4

This course will consist of lecture and lab exercises based on the Machinist's Handbook. The course will cover topics which are common in Design courses featuring: materials, threaded fasteners, bearings, gears, clutches, brakes, chain and power transmission, and critical speeds on shafts. Students will calculate forces, stresses, speeds, horsepower, and torque based on engineering formulas found in the Handbook. PREREQUISITE: 10606151 Strength of Materials.

10606159

Machine Design Problems (WBL) - Credits: 4

This final course in design brings the student to the industrial structure of an engineering department. The design of a machine or consumer product is carried from the concept state through detailed drawings including scheduling, determination of manufacturing processes, tooling requirements, cost estimation, and complete bills of materials. The group effort is directed toward the successful completion of the industrial-quality drawings. The students must develop CAD drawings, deal with vendors, expedite, and follow up the work to ensure its completion on schedule.

10623175

Geometric Dimensioning and Tolerancing - Credits: 2

This course is intended to provide an understanding of geometric dimensioning and tolerancing. It will incorporate uniformity in design practice, fewer misinterpretations, and ensure interchangeability and maximum tolerance allocation. The course is centered on the current American National Standard/ASME Y-14.5M.

Graduate Employment Information

(WITC Graduate Survey Responses 2005-2006)

Number of graduates	10	Number employed	7	% employed in WITC district	17%
Number of responses	8	Percent employed	100%	Range of yearly salary	\$29,742-\$50,000
Number available for employment	7	Employed in related field	6	Average yearly salary	\$36,594

career vision