## ABOUT THE PROGRAM

Mechanical design and engineering technicians help develop and test products, calculate strength and cost of materials, make drawings to scale, and work on prototypes and product improvement. Students work on acquiring high-level drafting skills and utilize a variety of Computer-Aided Drafting (CAD) software. They learn to construct and revise engineering working drawings and tooling drawings; research and apply information for parts and materials; and specify appropriate tolerances, materials, and other engineering data. Mechanical designers work on teams that focus on continuous improvement, Six Sigma initiatives, and lean manufacturing efforts.

## PROGRAM OUTCOMES

• Prepare detail and assembly drawings for documentation of mechanical components and products.
• Create CAD geometry, parts and assemblies.
• Design mechanical components and products.
• Analyze mechanical engineering problems.
• Select purchased parts.

## CAREER AND EDUCATION ADVANCEMENT OPPORTUNITIES

Lakeshore credits transfer to over 30 universities. For more information visit lakeshore.edu/future-students/transfer.

## ADMISSIONS AND FIRST SEMESTER ENROLLMENT STEPS

• Submit online application.
• Complete the online Student Success Questionnaire.
• Complete Get Started at Lakeshore appointment:
    • Application Check-in
    • College Orientation Overview
    • 1st Time Program Registration

*Submit high school transcripts, college transcripts, and test scores (optional, highly recommended). Official transcripts will be needed for transferring college credit(s) and for financial aid purposes.*

## ACADEMIC PREPAREDNESS/FUTURE SEMESTER ENROLLMENT STEPS

If applicable, complete program-specific academic preparedness requirements and enrollment steps prior to enrolling in occupational or core courses. Students will be notified if there is a program waitlist. View the college's program webpage for details: https://lakeshore.edu/programs-and-courses/career-areas/manufacturing/mechanical-design-and-engineering-technology.

## APPROXIMATE COSTS

$152.85 per credit tuition (WI resident) plus $9.17 per credit student activity fee. Material fee varies depending on course. Other fees vary by program. Visit lakeshore.edu/Financial-Aid/tuition-and-fees for details.

## FINANCIAL AID

This program is eligible for financial aid. Visit lakeshore.edu/Financial-Aid for more information.

## SPECIAL NOTE

Learn when you want. Progress at your own pace. Receive personalized coaching and support. The full CBE definition may be found at lakeshore.edu/cbe.

## CONTACT

Lakeshore College Recruiter
920.693.1366 • Recruitment@lakeshore.edu

| Catalog No. | Class Title | Credit(s) |
|---|---|---|
| **Term 1** | | |
| 10606201 | 2D Design-AutoCAD* | 2 |
| 10606208 | 3D Design-SolidWorks 1* | 2 |
| 31442385 | Weld Print 1-Print Fundamentals* | 1 |
| 10606100 | 2D Design Standards* | 1 |
| 10606204 | Manufacturing Processes and Materials* | 2 |
| 10606202 | Product Design & Rapid Prototyping* | 2 |
| 10804113 | College Technical Math 1A OR 10804198 Calculus 1** (4 cr) | 3 |
| 10801196 | Oral/Interpersonal Communication | 3 |
| | | **16** |
| **Term 2** | | |
| 10606206 | Tolerancing and GD&T* | 3 |
| 10606234 | Statics* | 2 |
| 10620212 | Design Applications* | 2 |
| 10606209 | 3D Design-SolidWorks 2-Part Drawings* | 2 |
| 10606210 | 3D Design-SolidWorks 3-Assembly & Drawings* | 2 |
| 10103121 | Excel - Level 1* | 1 |
| 10806154 | General Physics 1 | 4 |
| | | **16** |
| **Term 3** | | |
| 10606218 | Kinematics* | 3 |
| 10606219 | Strength of Materials* | 3 |
| 10606217 | Component Design* | 2 |
| 10606220 | Reverse Engineering* | 2 |
| 10606211 | 3D Design-SolidWorks 4-Advanced* | 2 |
| 10620130 | Mechanical Drive Systems | 3 |
| | | **15** |
| **Term 4** | | |
| 10606290 | Design for Manufacture and Assembly (DFMA)* | 2 |
| 10606298 | Engineering Technology Applications* | 4 |
| 10801136 | English Composition 1 | 3 |
| 10809196 | Introduction to Sociology OR 10809144 Macroeconomics OR 10809143 Microeconomics | 3 |
| 10809198 | Introduction to Psychology | 3 |
| | | **15** |
| | | **TOTAL 62** |

*CBE delivery only
**Calculus 1 is designed for students planning to transition to a 4-year college following Lakeshore program completion.

# REAL EXPERIENCE FOR THE REAL WORLD

2025-26

**2D DESIGN STANDARDS**…develops skills for creating engineering designs through the application of standards and procedures. Principles covered include view selection, orthographic projection, section and auxiliary views, and their utilization in working drawings. These skills will be reinforced using AutoCAD as the main software platform.

**2D DESIGN-AUTOCAD**...provides the learner with the best practice skills to utilize AutoCAD drawing editor, viewing commands; apply coordinate entry methods, AutoCAD file commands; utilize draw commands, modify commands; create and edit text, prints & plots; apply geometric construction to solve a drawing problem; utilize selection sets, duplicating modify commands, layers & objects properties, blocks; apply principles of orthographic and multi view projection.

**3D DESIGN-SOLIDWORKS 1**…introduces the students to the concepts and commands of parametric solid modeling. Students create sketches and add relationships to the sketch segments, extrude the sketches to create models, and add features such as fillets, cut extrude, chamfers, holes, draft, shell, lofts and sweeps. Emphasis is placed on the design intent of the parametric solid models and best practices to ensure robust engineering designs.

**3D DESIGN-SOLIDWORKS 2-PART DRAWINGS**...introduces students to the process of creating 2D documentation from the 3D models and adding details to those drawings. This includes projection views, section views, auxiliary views, and annotation applications. PREREQUISITE: 10606108 SolidWorks1-Parametric Modeling or COREQUISITE: 10606208 3D Design-SolidWorks 1

**3D DESIGN-SOLIDWORKS 3-ASSEMBLY & DRAWINGS**…continues the path of 2D documentation in SolidWorks with an emphasis on assemblies and drawings. The students will learn assembly creation (top-down vs bottom-up), adding fasteners, drawing creation, BOM creation, cut lists and other best practices. PREREQUISITE: 10606109 SolidWorks 2-Modeling/Details for Designers or COREQUISITE: 10606209 3D Design-SolidWorks 2-Part Drawings

**3D DESIGN-SOLIDWORKS 4-ADVANCED**...introduces students to advanced modeling and design techniques for part design in sheet metal, weldments, castings, and mold design. PREREQUISITE: 10606110 SolidWorks 3-Working Drawings for Designers or COREQUISITE: 10606210 3D Design-SolidWorks 3-Assembly & Drawings

**COLLEGE TECHNICAL MATHEMATICS 1A**...prepares student to solve linear, quadratic, and relational equations; graph; formula rearrangement; solve systems of equations; percent; proportions; and operations on polynomials. Emphasis will be on the application of skills to technical problems. Discuss math academic course support with your Counselor.

**COMPONENT DESIGN**...introduces the student to the various components found on machinery, including shafts, bearings, power transmissions, gears, and the selection of standard machine elements from manufacturers' catalogs, and the use of SolidWorks to understand the assembly of those components in your design. PREREQUISITE: 10606110 SolidWorks 3-Working Drawings for Designers or COREQUISITE: 10606210 3D Design-SolidWorks 3-Assembly & Drawings

**DESIGN APPLICATIONS**…reinforces basic design principles and best practices. Students will learn basic design principles of CNC, fabrication and fixtures then subject those designs to the "professionals" for a design review/approval process. PREREQUISITE: 10606108 SolidWorks 1-Parametric Modeling or COREQUISITE: 10606208 3D Design-SolidWorks 1

**DESIGN FOR MANUFACTURE AND ASSEMBLY (DFMA)**...introduces learners to and will apply the concept of Design for Manufacturing and Assembly (DFMA) to an industrial assembly. DFMA is an engineering methodology that focuses on reducing time-to-market and the total production cost by prioritizing both the ease of manufacture for the product's parts and the simplified assembly of those parts into the final product. PREREQS: 10606211 3D Design-SolidWorks 4-Adv or 10606111 SolidWorks-Adv Modeling and 10606218 Kinematics and 10606219 Strength of Materials and 10606210 3D Design-SolidWorks 3-Assembly & Drawings and 10606202 Product Design & Rapid Prototyping

**ENGINEERING TECHNOLOGY APPLICATIONS**...applies the knowledge and skills gained throughout the Mechanical Design and Engineering Technology program. This is a capstone course in which the learner will create a project portfolio that will showcase a full set of working drawings to produce an industrial assembly and all the design calculations to ensure function and lifecycle requirements. The learner will create a physical, working prototype in the MDET Fab Lab as part of this capstone project. PREREQUISITES: 10606211 3D Design-SolidWorks 4-Adv or 10606111 SolidWorks-Adv Modeling and 10606218 Kinematics and 10606219 Strength of Materials and 10606210 3D Design-SolidWorks 3-Assembly & Drawings and 10606202 Product Design & Rapid Prototyping

**ENGLISH COMPOSITION 1**…is designed for learners to develop knowledge and skills in all aspects of the writing process. Planning, organizing, writing, editing and revising are applied through a variety of activities. Students will analyze audience and purpose, use elements of research, and format documents using standard guidelines. Individuals will develop critical reading skills through analysis of various written documents. Discuss reading and writing academic course support with your Counselor.

**EXCEL - LEVEL 1**…introduces the student to spreadsheet features such as creating, saving, editing, navigating, formatting worksheets; entering formulas and functions; working with charts; and developing multiple-sheet workbooks.

**GENERAL PHYSICS 1**...presents the applications and theory of basic physics principles. This course emphasizes problem-solving, laboratory investigation, and applications. Topics include unit conversions and analysis, vectors, translational and rotational kinematics, translational and rotational dynamics, heat and temperature, and harmonic motion and waves. PREREQUISITE: 10804113 College Tech Math 1A. Discuss math academic course support with your Counselor.

**INTRODUCTION TO PSYCHOLOGY**...introduces students to a survey of the multiple aspects of human behavior. It involves a survey of the theoretical foundations of human functioning in such areas as learning, motivation, emotions, personality, deviance and pathology, physiological factors, and social influences. It directs the student to an insightful understanding of the complexities of human relationships in personal, social, and vocational settings. Discuss reading academic course support with your Counselor.

**INTRODUCTION TO SOCIOLOGY**...introduces students to the basic concepts of sociology: culture, socialization, social stratification, multi-culturalism, and the five institutions, including family, government, economics, religion, and education. Other topics include demography, deviance, technology, environment, social issues, social change, social organization, and workplace issues. Discuss reading academic course support with your Counselor.

**KINEMATICS**...equips students with the essential skills to identify the motions needed to achieve design objectives. SolidWorks will be utilized for calculating these motions. PREREQUISITE: 10804113 College Tech Math 1A or 10804115 College Technical Math 1 or 10804198 Calculus 1 or 10804118 Intermediate Algebra with Apps

**MANUFACTURING PROCESSES AND MATERIALS**...introduces the learner to various manufacturing processes (casting/molding, injection molding, sheet metal forming/ die cutting); machining processes (milling, turning, and drilling); assembly processes (welding, fasteners); and advanced manufacturing technology (3D printing, laser sintering, laser cutting). The learner will also learn how to properly use and read dial and digital micrometers; dial, digital and vernier calipers.

**MECHANICAL DRIVE SYSTEMS**...prepares the learner to use tools and fasteners safely; identify belt and chain drive components; install and adjust belt and chain drives; apply bearing and lubrication information; perform coupling alignment using straight edge, feeler gauge, and dial indicator and laser methods; identify various gear drives; calculate gear ratios; and analyze first-, second-, and third-class levers.

**ORAL/INTERPERSONAL COMMUNICATION**...provides students with the skills to develop speaking, verbal and nonverbal communication, and listening skills through individual speeches, group activities, and other projects. Discuss reading academic course support with your Counselor.

**PRODUCT DESIGN AND RAPID PROTOTYPING**...introduces students to product design and rapid prototyping methods. Students will discover the product design process, then utilizing the various equipment available in the MDET program's Fab Lab, produce an actual product they designed. PREREQUISITE: 10606108 SolidWorks 1-Parametric Modeling or COREQUISITE: 10606208 3D Design-SolidWorks 1

**REVERSE ENGINEERING**...prepares students to take an existing item, measure it, design it, and reproduce that part in our MDET Fab Lab. Students will also be introduced to a reverse engineering scanner system and software, used for reverse engineering applications in the SolidWorks 3D modeling environment. PREREQUISITE: 10606102 Product Design & Rapid Prototyping or COREQUISITE: 10606202 Product Design & Rapid Prototyping

**STATICS**...introduces the forces on and in structures that are at rest utilizing SolidWorks. Forces, vectors, resultants, moments, couples, equilibrium, free-body diagrams, friction, centroids, and centers of gravity, and moments of inertia are covered. PREREQUISITE: 10804113 College Tech Math 1A or 10804115 College Technical Math 1 or 10804198 Calculus 1 or 10804118 Intermediate Algebra with Apps

**STRENGTH OF MATERIALS**...provides the learner with the skills to identify and calculate centers of gravity, moments of inertia, and stresses induced in force-bearing elements for the purpose of sizing the material in that element, specifically studying shear, axial, bending, torsional, and combined stresses. PREREQUISITE: 10606234 Statics or 10606134 Statics

**TOLERANCING AND GD&T**...provides the learner with the skills to apply and interpret tolerancing standards for both rectangular and geometric tolerancing (ASME 14.5M-2018) on part drawings, including form, profile, orientation, runout, and positional tolerances. Additionally, the learning will design mating parts and tolerance stack ups with and without GD&T.

**WELD PRINT 1-PRINT FUNDAMENTALS**...prepares the learner to interpret manufacturing drawing by applying orthographic projection principles, by recognizing types of lines used in print reading and how manufacturing prints are dimensioned. Develop print reading strategies by locating the bill of materials, title blocks, and revision blocks. Learners will be introduced to the AWS welding symbols and how they relate to manufacturing drawing.