Program Number 10-623-3
Associate Degree in Applied Science • Four Terms

ABOUT THE PROGRAM

Manufacturing Engineering Technology program prepares students to work in the manufacturing sector assisting engineering and management in the design and development of new products and in the improvement of production processes.

PROGRAM OUTCOMES

- Characterize how lean culture and tools can help an organization achieve operational excellence.
- Apply proper engineering principles in design.
- Utilize computer - aided applications in design and manufacture of products and processes.
- Demonstrate the principles of material selection and application.
- Apply automation principles for design and control of manufacturing processes.

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/manufacturing-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		
10664110	Introduction to Mechatronics*	2
10804113	College Technical Math 1A OR 10804198 Calculus 1** (4 cr)	3
10103121	Excel - Level 1*	1
10196189	Team Building and Problem Solving*	3
10606208	3D Design-SolidWorks 1*	2
10620224	Microcontroller Programming*	1
10606204	Manufacturing Processes and Materials*	2
		14
Term 2		
10664100	Introduction to Industrial Control Systems*	2
10664120	Industrial Internet of Things*	2
10606234	Statics*	2
10620255	Hydraulics and Pneumatics*	3
10620238	Programmable Controllers - Allen Bradley*	3
10801136	English Composition 1	3
		15
Term 3		
10623110	Lean Six Sigma - Measure and Analyze*	4
10623111	Lean Six Sigma - Improve & Control*	4
10196188	Project Management*	3
10449114	Safety in the Workplace*	3
10620168	Robotics Introduction	2
		16
Term 4		
10462211	Maintenance Print Reading* OR 10623123 Blueprint Reading and Metrology* (3 cr)	2
10623270	Manufacturing Cost Analysis*	3
10620171	Robotics Advanced	2
10809144	Macroeconomics OR 10809143 Microeconomics OR 10809196 Introduction to Sociology (3 cr)	3
10809198	Introduction to Psychology	3
10801196	Oral/Interpersonal Communication	3
		16
		TOTAL 61

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

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.

COLLEGE TECHNICAL MATHEMATICS 1A…prepares the 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.

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.

HYDRAULICS AND PNEUMATICS…prepares the learner to identify hydraulic and pneumatic component symbols and terms, adjust a pressure relief valve, analyze the operation of a pilot operated relief valve; analyze Pascal's law; evaluate flow, velocity, work and power in industrial hydraulic and pneumatic circuits; analyze meter-in, meter-out, and bypass flow control circuits; identify basic hydraulic and pneumatic control valves; and assemble hydraulic circuits. COREQUISITE: 10804113 College Tech Math 1A

INDUSTRIAL INTERNET OF THINGS…introduces learners to theoretical and practical topics of the Industrial Internet of Things (IIoT). The learner investigates the range of sensor and actuator devices available, ways in which they communicate and compute, methods for getting information to and from IIoT-enabled devices, and ways of visualizing and processing data acquired from the IIoT. Upon completion, learners will utilize hardware and software to construct a sensor network within an existing system and utilize industry standard tools to visualize the data captured. COREQUISITE: 10664110 Introduction to Mechatronics or CONDITION: 106314 Manufacturing IT

INTRODUCTION TO INDUSTRIAL CONTROL SYSTEMS…introduces learners to basic concepts of industrial computer-controlled systems. The learner explores various types of programming using robots and PLCs and participates in lab experiments designed to introduce programming principles, electronic inputs and outputs (analog and digital), communication between system components including Ethernet protocols. Upon completion of the course, learners will be able to explain how the control processes are utilized to automate manufacturing facilities. COREQUISITE: 10664110 Introduction to Mechatronics

INTRODUCTION TO MECHATRONICS…introduces learners to microprocessor controlled electromechanical systems. The learner examines how individual components work, and how they are integrated into simple systems. Upon completion of the course, learners will understand what technicians do in the workplace and how industry utilizes Mechatronics in advanced manufacturing.

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.

LEAN SIX SIGMA - IMPROVE & CONTROL…provides the student with the skills and tools to select and implement solutions to solve problems and improve processes. An emphasis is placed on the use of statistical techniques in solution selection including correlation, regression, and statistical process control. Lean manufacturing methods including SMED, POUS, cellular manufacturing, mistake proofing, TPM, 5S and visual management are practiced. Students learn how to create a control plan. COREQUISITE: 10623110 Lean Six Sigma -Measure & Analyze

LEAN SIX SIGMA - MEASURE AND ANALYZE…provides the student with skills and tools to collect and analyze data to solve problems and improve processes within an organization. Various techniques for process mapping are explored including SIPOC, FMEA, VSM, standard work sheets, and spaghetti diagrams. Statistical tools are explored including probability, confidence intervals, measurement systems analysis, hypothesis testing, and TAKT time analysis to create and implement a data collection plan.

MACROECONOMICS...is an introductory course. Basic social choices regarding economic systems, basic economic aggregates, fiscal policy, the banking system, monetary policy, and international trade are the principle topics discussed in the course. Balance is drawn between theory, analysis, and a critique of the institutions that characterize modern mixed-capitalist economies. Conflicting social goals, economic constraints, and environmental concerns provide the framework through which the macroeconomy is analyzed. Discuss reading academic course support with your Counselor.

MAINTENANCE PRINT READING…prepares the learner to read prints; make isometric sketches; interpret orthographic projection drawings, to include sections, surface finishes, and tolerancing.

MANUFACTURING COST ANALYSIS…covers cost estimating and financial analysis techniques employed in typical manufacturing and processing industries. Topics include product material and labor costing, justification of expenditures and capital equipment, make vs buy analysis, and inventory costs. Also provides an understanding of soft costs, budgeting, and understanding cost behavior.

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.

MICROCONTROLLER PROGRAMMING…introduces the learner to concepts in basic digital programming, programming logic, electronic components, and Digital and Analog I/O.

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.

PROGRAMMABLE CONTROLLERS - ALLEN BRADLEY…prepares the learner to understand basic PLC structure and terminology; learn to create and troubleshoot basic PLC programs using the RSLOGIX 500 software and the RSLINX communication software; become familiar with communicating with programming SLC-500 PLCs. This course is highly computer based. Class may qualify for 64 hours of Continuing Education Units (CEUs) for Electricians.

PROJECT MANAGEMENT...introduces the learner to explore the relationship of existing and emerging processes and technologies to manufacturing strategy and supply chain-related functions. This course addresses three main topics: aligning resources with the strategic plan, configuring and integrating operating processes to support the strategic plan, and implementing change.

ROBOTICS ADVANCED…introduces students to adv robot programming commands to include use of Fanuc IRvision on both Fanuc Robotic arm and Delta Robots. Once a student completes both Robotic Introduction and Robotics Advanced they will be well prepared to take the FanucCertification test by NOCTI. Class may qualify for 48 hours of Continuing Education Units (CEUs) for Electricians. PREREQ: 10620168 Robotics Introduction.

ROBOTICS INTRODUCTION...introduces the student to robotic axes, movement control, navigating the teach pendant, robotic frames, basic programming commands such as conditional branching, wait and call instructions. Class may qualify for 48 hours of Continuing Education Units (CEUs) for Electricians.

SAFETY IN THE WORKPLACE…applies the skills and tools necessary to provide a safe and secure work environment. Each learner will demonstrate the application of safety awareness, federal/state/local compliance, incident investigation and documentation, human relations techniques, safety orientation, inspections, and risk analysis, issues of workplace violence, substance abuse, and health hazards, first aid and CPR, fire and electrical safety, emergency preparedness, and liaison with external agencies.

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

TEAMBUILDING AND PROBLEM SOLVING...applies the skills and tools necessary to facilitate problem solving in a team environment. Each learner will demonstrate the application of the benefits and challenges of group work, necessary roles in a team, stages of team development, different approaches to problem solving, consensus, a systematic process of problem definition, data acquisition, analysis, developing alternative solutions, solution implementation, and evaluation.