

## Computer Integrated Manufacturing Technology

Lakeland's Computer Integrated Manufacturing Technology degree program prepares students for employment in a variety of manufacturing industries. There are two choices available to students in this degree program:

- General Manufacturing Major (AWT)
- Maintenance and Repair Concentration (AWT, ArcelorMittal)

Both degrees are approved by the AWT (Alliance for Working Together <http://thinkmfg.com/>) to meet employment needs throughout the Alliance in Northeast Ohio.

Students are reminded of the college's policy requiring students in associate of applied science programs to have a "C" grade or better in their applicable technical courses. Students who are concerned about their grades should consult with the Counseling Office or the department chair for the approved list of technical courses for their specified degree program.

**Certificates are also available.**

### Computer Integrated Manufacturing Technology Certificates

- CNC Operator Mini Certificate
- CNC Set-Up and Programming Technology
- Computer Integrated Manufacturing Technology
- Industrial Computer Hardware Technician
- Production Shift Leader/Manufacturing Management
- Tool and Die Technology
- Tool Room/Maintenance Machinist

Gainful Employment	Program Name	Program Type	Area of Study
	General Manufacturing Major (9430) , AAS ( <a href="https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/9430/">https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/9430/</a> )	Degree	CIMN
	Maintenance and Repair Concentration (9439) , AAS ( <a href="https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/9439/">https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/9439/</a> )	Degree	CIMN
	CNC Operator Mini Certificate (4315) ( <a href="https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/4315/">https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/4315/</a> )	Certificate	CIMN
	CNC Set-Up and Programming Technology Certificate (4312) ( <a href="https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/4312/">https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/4312/</a> )	Certificate	CIMN
	Computer Integrated Manufacturing Technology Certificate (4311) ( <a href="https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/4311/">https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/4311/</a> )	Certificate	CIMN
	Industrial Computer Hardware Technician Certificate (4241) ( <a href="https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/4241/">https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/4241/</a> )	Certificate	CIMN
	Production Shift Leader/Manufacturing Management Certificate (4351) ( <a href="https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/4351/">https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/4351/</a> )	Certificate	CIMN
	Tool Room/Maintenance Machinist Certificate (4302) ( <a href="https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/4302/">https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/4302/</a> )	Certificate	CIMN
	Tool and Die Technology Certificate (4303) ( <a href="https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/4303/">https://catalog.lakelandcc.edu/degree-certificate-programs/cimn/4303/</a> )	Certificate	CIMN

#### CIMN 1001 Careers in Manufacturing

**1 Credit**

This course is designed for students with little to no background in manufacturing who wish to learn more about the field in preparation for a manufacturing career. Primary topics covered include the manufacturing process, what it's like to work in manufacturing, various career pathways, the skills utilized in manufacturing environments, and clarification of degree and certificate programs. (1 contact hour)

**CIMN 1050 Manufacturing Fundamentals****3 Credits***Prerequisite: MATH 0745 or placement into MATH 0850 or MATH 1080.*

This course introduces students to skills that will help them communicate and succeed in manufacturing environments. The main communication concepts that are addressed are shop mathematics, blueprint reading, welding symbols and geometric dimensioning and tolerancing (GD&T). It covers mathematical concepts such as fractions, decimals, the metric system, oblique triangles and right-triangle trigonometry, solving multiple input machining formulas, reading and applying cutting data charts, and interpreting cutting tool diagrams. Blueprint reading incorporates American Society of Mechanical Engineering (ASME) standards to examine basic concepts of mechanical drawings including line types and uses, orthographic and auxiliary views, title blocks, notes, section views, dimensions, tolerances, and Computer Numerical Control (CNC) fundamentals.

(3 contact hours)

**CIMN 1110 Machining Processes****3 Credits***Prerequisite: CIMN 1050 (may be taken concurrently) or MATH 1080 or successful completion of Math Placement Test into MATH 1180 or permission of instructor.*

This course introduces students to basic material removal processes and equipment used in manufacturing, including machine tools and accessories; cutting principles and chip formation; inspection and quality control; determination of feed, speed, depth of cut, material removal rate, and horsepower; process procedures for both producing and inspecting a part; and automation, robotics, numerical control, flexible manufacturing and computer integrated manufacturing (CIM). Laboratory experience includes the creation of operation sheets and inspection forms, selection or calculation of operating variables, machining and inspecting parts produced; and the analysis, evaluation and communication of results and conclusions. Students must provide safety glasses for use in the laboratory and a portable calculator capable of exponents and roots.

(4 contact hours: 2 lecture, 2 lab)

**CIMN 1160 Applied Electricity****2 Credits***Prerequisite: MATH 1001 or MATH 1080 or placement into MATH 1180.*

This course, designed for mechanical and manufacturing technology students, provides a basic understanding of electricity as well as commonly used components and how these function. The course introduces students to electrical safety, electrical measurements, AC and DC circuits, common electrical components, and fundamentals of motors, transformers, controls, and programmable logic controllers (PLCs). Laboratory experience includes building and testing simple circuits from schematics, using test equipment, operating electrical, rotating equipment, relay logic and ladder control circuit programming of PLCs, and elementary analog and digital circuits.

(3 contact hours: 1 lecture, 2 lab)

**CIMN 1210 Materials Processing****3 Credits***Prerequisite: ENGR 1000, MATH 1001 or MATH 1080 or higher.*

This course, a continuation of CIMN 1110 Machining Processes, introduces students to the basic conserving, joining, and conditioning processes and equipment used in manufacturing including casting, forging, welding, powder metallurgy, plastics, metal forming, heat treatment and surface finishing, hot and cold working, additive manufacturing, and mechanical testing. Laboratory experience requires investigative experimentation into the engineering properties of materials, products of conditioning and welding processes, and the creation and evaluation of aluminum cast parts, with written and oral communication of the analysis, results, and conclusions. Students must provide safety glasses for use in the laboratory and a portable calculator capable of exponents and roots.

(4 contact hours: 2 lecture, 2 lab)

**CIMN 1420 Computer Numerical Control Part Programming (CNC)****2 Credits***Prerequisite: CIMN 1110 (may be taken concurrently) or proficiency test, CIMN 1050 (may be taken concurrently) or MATH 1001 or MATH 1080.*

This course introduces students to the history and terminology of computer numerical control (CNC) and the development of CNC programs using International Standards Organization (ISO) coding system (G-codes) mode including part analysis, tool selection, program development, program input, tool path simulation, editing, speed and feed determination, and part manufacture. Laboratory experience includes writing simple CNC programs; entering, downloading, and simulating tool path; and examples of machining simple parts on CNC milling and turning centers.

(3 contact hours: 1 lecture, 2 lab)

**CIMN 1430 Introduction to Computer Assisted Part Programming****2 Credits***Prerequisite: CIMN 1110, CIMN 1420.*

This course introduces students to Computer Aided Manufacturing (CAM) and the development of multi-axis CNC part programs and files ready for downloading to machining and turning centers. Laboratory experience includes blueprint analysis to determine part holding method, order of operations, tooling, feeds and speeds, creation of part and fixture geometry, definition of tool paths, graphical verification of tool path, and post processing to generate ISO or Conversational CNC code for milling machine, turning machine, machining center, turning center and wire machine applications.

(3 contact hours: 1 lecture, 2 lab)

**CIMN 1450 Programming CNC Lathes****2 Credits***Prerequisite: CIMN 1420.*

This course, a continuation of CIMN 1420 Computer Numerical Control Part Programming (CNC), introduces students to advanced features of setting-up and programming CNC turning centers using ISO standard (G-codes) mode of programming including fixed cycles and multiple repetitive cycles (automatic repeat cycles) dealing with roughing, finishing and threading. Laboratory experience includes the production of parts conforming to print specification with progressively more comprehensive turning programs.  
(3 contact hours: 1 lecture, 2 lab)

**CIMN 1460 Programming CNC Machining Centers****2 Credits***Prerequisite: CIMN 1420.*

This is a continuation of CIMN 1420 Computer Numerical Control Part Programming (CNC), with emphasis on advanced features of setting-up and programming CNC machining centers using ISO standard (G-codes) mode programming, including the use of canned cycles involving drilling, drilling with dwell, peck drilling, tapping, boring, milling, machining at equal intervals, and pocket milling. Laboratory experience includes production of parts to print specifications with progressively more comprehensive machining programs.  
(3 contact hours: 1 lecture, 2 lab)

**CIMN 2190 Manufacturing Methods and Costs****3 Credits***Prerequisite: CADT 1100 or CADT 2100, CIMN 1110.*

This course introduces students to the principles of manufacturing (production) methods as well as costs and cost analysis that lead to more efficient utilization of manufacturing resources. Topics include an introduction to job order costs, budgetary cost control, standard costs, and direct costing; cost improvement methods; and economic analysis of engineering proposals. Laboratory experience includes independent research and problem solving projects involving the evaluation of alternative methods and procedures; cost estimating, cost studies, cost reporting, analysis of cost data, performance of productivity measurement, evaluation of engineering proposals, return-on-investment, interest, break-even analysis, depreciation, and cash flow.  
(4 contact hours: 2 lecture, 2 lab)

**CIMN 2240 Jig and Fixture Design****2 Credits***Prerequisite: CIMN 1110, CADT 2100.*

This course introduces students to the design and manufacture of jigs and fixtures, utilizing AutoCAD design software, with special emphasis on simplicity and economy, and incorporating geometric dimensioning and tolerancing (G, D&T). The course includes an overview of types of specialized workholding and tooling devices, including power, modular, welding, inspection, and computer numerical (CNC) jigs and fixtures; the identification of the source of design data; the analysis of sample parts for locating and supporting characteristics; and the development of a design plan. Laboratory experience includes design of template, vise-held, plate, angle-plate, channel and box, and vise-jaw jigs and fixtures from sample parts.  
(4 contact hours: 1 lecture, 3 lab)

**CIMN 2390 Fluid Power Technology****3 Credits***Prerequisite: PHYS 1100, PHYS 1200 or PHYS 1550 or PHYS 1610.*

This course introduces students to the field of fluid power, including theory and applications, energy input devices, energy output devices, energy modulation devices, and auxiliary system components; storage and distribution systems as well as fluids conditioning and contamination, with emphasis on fluids, equipment, and system operation. Laboratory experience includes the assembly of standard components to perform typical industry standard fluid power system applications. Students must provide an approved set of safety goggles and a portable calculator capable of calculating exponents and roots.  
(4 contact hours: 2 lecture, 2 lab)

**CIMN 2840 Repair and Maintenance Capstone****2 Credits***Prerequisite: CIMN 2390 (can be taken concurrently), MECT 2150.*

This capstone course integrates prior learning and rigging as related to industrial maintenance and repair. Students will learn principles and applications of industrial safety, and rigging, hydraulic, pneumatic, and mechanical systems. The course will also review basic industrial skills including measurement, blueprint reading, tools, and basic calculations.  
(2 contact hours)

**CIMN 2875 Design and Manufacturing Capstone****3 Credits***Prerequisite: CADT 2100, CIMN 1110, CIMN 2240 or MECT 2230.*

This capstone course integrates prior learning in product and machine design, manufacturing and automation. Students will utilize their skills to design, analyze, manufacture, and evaluate one or more functional and marketable products. Students will use concepts of machine and product design, manufacturing principles, and automation in a team environment resulting in the related documentation and prototype ready for manufacture.  
(5.25 contact hours: 0.75 lecture, 4.5 lab)


## General Manufacturing Major (9430)

### Associate of Applied Science Degree

The General Manufacturing major prepares students for employment as engineering technicians at the operations level in manufacturing industries having a concentration in computer applications. Technicians assist in the design and implementation of manufacturing process systems that include numerical control equipment, computer aided part programming, computer aided manufacturing, factory automation, and flexible manufacturing cells and systems.

Course	Title	Credit Hours
<b>First Semester</b>		
CIMN 1050	Manufacturing Fundamentals	3
CIMN 1110	Machining Processes	3
ENGL 1110 or ENGL 1111	English Composition I (A) <sup>1</sup> or English Composition I (B)	3
ENGR 1000 or ENGS 1000	Introduction to Engineering Technology or Introduction to Engineering	2
FYEX 1000	First Year Experience	1
<b>1st 8 weeks</b>		
CIMN 1420	Computer Numerical Control Part Programming (CNC)	2
<b>2nd 8 weeks</b>		
CIMN 1430	Introduction to Computer Assisted Part Programming	2
<b>Credit Hours</b>		<b>16</b>
<b>Second Semester</b>		
CADT 1100	Introduction to AutoCAD	3
CIMN 1210	Materials Processing	3
CIMN 1450	Programming CNC Lathes	2
CIMN 1460	Programming CNC Machining Centers	2
ENGL 1120 or BUSM 2400	English Composition II or Business Communication	3
MATH 1180	Technical Mathematics I	4
<b>Credit Hours</b>		<b>17</b>
<b>Third Semester</b>		
CADT 2100	Introduction to SolidWorks	3
CIMN 2190	Manufacturing Methods and Costs	3
CIMN 2240	Jig and Fixture Design	2
COMM 1000 or COMM 1100	Effective Public Speaking or Effective Interpersonal Communications	3
PHYS 1550	Everyday Physics	3
<b>Credit Hours</b>		<b>14</b>
<b>Fourth Semester</b>		
BUSM 1300 or BUSM 1330	Introduction to Business or Business Ethics	3
CIMN 2875	Design and Manufacturing Capstone	3
QENT 1200	Quality Concepts and Techniques	2
Select course(s) from the Arts and Humanities Electives list		3
Select course(s) from the Social and Behavioral Sciences Electives list		3
<b>Credit Hours</b>		<b>14</b>
<b>Total Credit Hours</b>		<b>61</b>

<sup>1</sup> English course selection is based on placement test results (ENGL 1111 English Composition I (B) is 4 credits, only 3 credits apply to the degree).

 This course is designated as a technical course in the program. Students must earn a "C" grade or higher in the course to fulfill the college's graduation requirements policy.

## Electives












Course	Title	Credit Hours
<b>Arts and Humanities</b>		
ARTS 1120	Art Appreciation	3
ARTS 2220	Survey of Art I	3
ARTS 2230	Survey of Art II	3
ENGL 2250	Survey of American Literature I	3
ENGL 2260	Survey of American Literature II	3
ENGL 2280	Survey of British Literature I	3
ENGL 2290	Survey of British Literature II	3
HUMX 1100	Introduction to Humanities	3
HUMX 1200	The American Experience in the Arts	3
MUSC 1200	Music Appreciation	3
MUSC 1215	World Music	3
MUSC 1800	Popular Music: Rock, Jazz, Country, and Hip-Hop	3
MUSC 2200	Music History and Literature I	3
MUSC 2250	Music History and Literature II	3
PHIL 1500	Introduction to Philosophy	3
PHIL 2000	Comparative Religion	3
PHOT 1000	History of Photography	3
<b>Social and Behavioral Sciences</b>		
ANTH 1160	Introduction to Cultural Anthropology	3
ECON 1150	Basic Economics	3
ECON 2500	Principles of Macroeconomics	3
ECON 2600	Principles of Microeconomics	3
GEOG 1500	Introduction to Geography	3
GEOG 1600	World Regional Geography	3
HIST 1150	Western Civilization I: Antiquity Through the Reformation	3
HIST 1250	Western Civilization II: Age of Revolution Through the Present	3
HIST 2150	U.S. History: Colonization Through Reconstruction	3
POLS 1300	U.S. National Government	3
POLS 2500	Modern Political Ideologies	3
PSYC 1500	Introduction to Psychology	3
SOCY 1150	Principles of Sociology	3

## Maintenance and Repair Concentration (9439)

### Associate of Applied Science Degree

The Maintenance and Repair Concentration prepares graduates for repairing and maintaining equipment in an industrial environment.

The AWT option is designed to meet AWT employment needs throughout the Alliance in Northeast Ohio. See <http://thinkmfg.com/>.


Course	Title	Credit Hours
<b>First Semester</b>		
CADT 1100	Introduction to AutoCAD 	3
CIMN 1110	Machining Processes 	3
ENGL 1110 or ENGL 1111	English Composition I (A) <sup>2</sup> or English Composition I (B)	3
ENGR 1000	Introduction to Engineering Technology	2
FYEX 1000	First Year Experience	1
MATH 1080	Introduction to Technical Mathematics	4
<b>Credit Hours</b>		<b>16</b>
<b>Second Semester</b>		
CIMN 1160	Applied Electricity 	2
CIMN 1210	Materials Processing 	3
MATH 1180	Technical Mathematics I	4
MECT 1150	Technical Communications	3
PHYS 1200	Applied Physics Heat and Thermodynamics	3
Select course(s) from the Technical Electives list 		2
<b>Credit Hours</b>		<b>17</b>
<b>Third Semester</b>		
COMM 1000 or COMM 1100	Effective Public Speaking or Effective Interpersonal Communications	3
MECT 2150	Power Transmission 	2
PHYS 1100	Applied Physics Mechanics	3
Select course(s) from the Arts and Humanities Electives list		3
Select course(s) from the Technical Electives list 		4
<b>Credit Hours</b>		<b>15</b>
<b>Fourth Semester</b>		
CIMN 2390	Fluid Power Technology 	3
CIMN 2840	Repair and Maintenance Capstone 	2
QENT 1200	Quality Concepts and Techniques 	2
Select course(s) from the Social and Behavioral Sciences Electives list		3
Select course(s) from the Technical Electives list 		6
<b>Credit Hours</b>		<b>16</b>
<b>Total Credit Hours</b>		<b>64</b>

<sup>1</sup> English course selection is based on placement test results (ENGL 1111 English Composition I (B) is 4 credits, only 3 credits apply to the degree).

<sup>3</sup> The co-op experience(s) with a company in the AWT will have a maximum of 2 credits.

<sup>4</sup> There are two co-op experiences, each with ArcelorMittal, for a maximum of 2 credits.

<sup>5</sup> There is a maximum of 2 credits for ENGR 2800.

 This course is designated as a technical course in the program. Students must earn a "C" grade or higher in the course to fulfill the college's graduation requirements policy.

## Technical Electives: minimum 12 credits

Students are required to develop an area of emphasis in the program through the selection of technical electives. Options include:

- Maintenance and Repair Option
- AWT Endorsed Option (Alliance for Working Together Consortium)
- ArcelorMittal Endorsed Option







The **Maintenance and Repair Option** requires the following elective course:

Course	Title	Credit Hours
MECT 1600	Geometric Dimensioning and Tolerancing 	2




















The **AWT Endorsed Option** requires all of the following elective courses:

Course	Title	Credit Hours
MECT 1600	Geometric Dimensioning and Tolerancing 	2
ENGR 2800	Engineering Co-Op Experience  <sup>3</sup>	1

The **ArcelorMittal Endorsed Option** requires all of the following elective courses:

Course	Title	Credit Hours
ENGR 2800	Engineering Co-Op Experience  <sup>4</sup>	1
ENGR 2800	Engineering Co-Op Experience  <sup>4</sup>	1
WELD 1300	Thermal Cutting, Gouging, Brazing, and Soldering 	2
WELD 1320	Basic SMAW (Stick) Welding 	2
WELD 1330	Basic GTAW (TIG) 	3
WELD 1340	Basic FCAW (Flux Cored) and GMAW (MIG/MAG) Welding 	3

Students are required to choose the remaining technical electives from the following list of courses:

Course	Title	Credit Hours
CADT 1500	Advanced AutoCAD 	3
CADT 2100	Introduction to SolidWorks 	3
CADT 2500	Advanced SolidWorks 	3
CIMN 1420	Computer Numerical Control Part Programming (CNC) 	2
CIMN 1430	Introduction to Computer Assisted Part Programming 	2
CIMN 1450	Programming CNC Lathes 	2
CIMN 1460	Programming CNC Machining Centers 	2
CIMN 2190	Manufacturing Methods and Costs 	3
CIMN 2240	Jig and Fixture Design 	2
CNET 1100	Cisco Networking Technology I 	2
CNET 1200	Cisco Networking Technology II 	2
CNET 1300	Cisco Networking Technology III 	2
CPET 1120	C Programming for Engineering Technology 	3
ENGR 2800	Engineering Co-Op Experience  <sup>5</sup>	1-2
MECT 1600	Geometric Dimensioning and Tolerancing 	2
WELD 1300	Thermal Cutting, Gouging, Brazing, and Soldering 	2
WELD 1320	Basic SMAW (Stick) Welding 	2
WELD 1340	Basic FCAW (Flux Cored) and GMAW (MIG/MAG) Welding 	3
WELD 1370	Basic Pipe Welding 	3

## Electives

Course	Title	Credit Hours
<b>Arts and Humanities Electives</b>		
ARTS 1120	Art Appreciation	3
ARTS 2220	Survey of Art I	3
ARTS 2230	Survey of Art II	3
ENGL 2250	Survey of American Literature I	3
ENGL 2260	Survey of American Literature II	3
ENGL 2280	Survey of British Literature I	3
ENGL 2290	Survey of British Literature II	3
HUMX 1100	Introduction to Humanities	3
HUMX 1200	The American Experience in the Arts	3
MUSC 1200	Music Appreciation	3
MUSC 1215	World Music	3
MUSC 1800	Popular Music: Rock, Jazz, Country, and Hip-Hop	3
MUSC 2200	Music History and Literature I	3
MUSC 2250	Music History and Literature II	3
PHIL 1500	Introduction to Philosophy	3
PHIL 2000	Comparative Religion	3
PHOT 1000	History of Photography	3
<b>Social and Behavioral Sciences Electives</b>		
ANTH 1160	Introduction to Cultural Anthropology	3
ECON 1150	Basic Economics	3
ECON 2500	Principles of Macroeconomics	3
ECON 2600	Principles of Microeconomics	3
GEOG 1500	Introduction to Geography	3
GEOG 1600	World Regional Geography	3
HIST 1150	Western Civilization I: Antiquity Through the Reformation	3
HIST 1250	Western Civilization II: Age of Revolution Through the Present	3
HIST 2150	U.S. History: Colonization Through Reconstruction	3
HIST 2250	U.S. History: Reconstruction to the Present	3
POLS 1300	U.S. National Government	3
POLS 2500	Modern Political Ideologies	3
PSYC 1500	Introduction to Psychology	3
SOCY 1150	Principles of Sociology	3



## CNC Operator Mini Certificate (4315)

**NOTE:** Some courses in this certificate are available only on weekends.

Course	Title	Credit Hours
CADT 1100	Introduction to AutoCAD	3
CIMN 1050	Manufacturing Fundamentals	3
CIMN 1110	Machining Processes	3
CIMN 1420	Computer Numerical Control Part Programming (CNC)	2
CIMN 1450	Programming CNC Lathes	2
CIMN 1460	Programming CNC Machining Centers	2
<b>Total Credit Hours</b>		<b>15</b>

## CNC Set-Up and Programming Technology Certificate (4312)

Course	Title	Credit Hours
CADT 1100	Introduction to AutoCAD	3
CADT 2100	Introduction to SolidWorks	3
CIMN 1050	Manufacturing Fundamentals	3
CIMN 1110	Machining Processes	3
CIMN 1420	Computer Numerical Control Part Programming (CNC)	2
CIMN 1430	Introduction to Computer Assisted Part Programming	2
CIMN 1450	Programming CNC Lathes	2
CIMN 1460	Programming CNC Machining Centers	2
ENGR 1000	Introduction to Engineering Technology	2
MECT 1150	Technical Communications	3
<b>Total Credit Hours</b>		<b>25</b>

## Computer Integrated Manufacturing Technology Certificate (4311)

Course	Title	Credit Hours
CADT 1100	Introduction to AutoCAD	3
CIMN 1050	Manufacturing Fundamentals	3
CIMN 1110	Machining Processes	3
CIMN 1210	Materials Processing	3
CIMN 1420	Computer Numerical Control Part Programming (CNC)	2
CIMN 1430	Introduction to Computer Assisted Part Programming	2
CIMN 2190	Manufacturing Methods and Costs	3
CIMN 2240	Jig and Fixture Design	2
ENGR 1000	Introduction to Engineering Technology	2
MECT 1150	Technical Communications	3
<b>Total Credit Hours</b>		<b>26</b>

## Industrial Computer Hardware Technician Certificate (4241)

**NOTE:** CPET 1050 Assembling, Upgrading and Repairing Personal Computers has a prerequisite of prior exposure to applied technologies or successful completion of the CIM or ET Tech Prep programs.

Course	Title	Credit Hours
ENGR 1000	Introduction to Engineering Technology	2
CNET 1100	Cisco Networking Technology I	2
CPET 1050	Assembling, Upgrading and Repairing Personal Computers	2
CPET 1120	C Programming for Engineering Technology	3
CPET 2050	Advanced Assembly and Repair of Personal Computers	2
ITON 1070	Operating Systems: Skills and Techniques	1
ITON 1205	Network+ and Networking Essentials	2
ITON 2080	Supporting Client Operating Systems	2
<b>Total Credit Hours</b>		<b>16</b>

## Production Shift Leader/Manufacturing Management Certificate (4351)

Course	Title	Credit Hours
BUSM 1300	Introduction to Business	3
BUSM 1330	Business Ethics	3
BUSM 1800	Essentials of Management and Supervision	3
CADT 1100	Introduction to AutoCAD	3
CIMN 1050	Manufacturing Fundamentals	3
CIMN 1110	Machining Processes	3
CIMN 1210	Materials Processing	3
CIMN 2190	Manufacturing Methods and Costs	3
ENGR 1000 or ENGS 1000	Introduction to Engineering Technology Introduction to Engineering	2
MECT 1150	Technical Communications	3
<b>Total Credit Hours</b>		<b>29</b>

## Tool Room/Maintenance Machinist Certificate (4302)

Course	Title	Credit Hours
<b>First Semester</b>		
CIMN 1050	Manufacturing Fundamentals	3
<b>Credit Hours</b>		<b>3</b>
<b>Second Semester</b>		
ENGR 1000 or ENGS 1000	Introduction to Engineering Technology or Introduction to Engineering	2
<b>Credit Hours</b>		<b>2</b>
<b>Third Semester</b>		
CADT 1100	Introduction to AutoCAD	3
CIMN 1110	Machining Processes	3
<b>Credit Hours</b>		<b>6</b>
<b>Fourth Semester</b>		
CIMN 1210	Materials Processing	3
<b>Credit Hours</b>		<b>3</b>
<b>Fifth Semester</b>		
CIMN 1420	Computer Numerical Control Part Programming (CNC)	2
<b>Credit Hours</b>		<b>2</b>
<b>Sixth Semester</b>		
CIMN 1450	Programming CNC Lathes	2
CIMN 1460	Programming CNC Machining Centers	2
<b>Credit Hours</b>		<b>4</b>
<b>Total Credit Hours</b>		<b>20</b>

## Tool and Die Technology Certificate (4303)

Course	Title	Credit Hours
<b>First Semester</b>		
CIMN 1050	Manufacturing Fundamentals	3
		<b>Credit Hours</b>
		<b>3</b>
<b>Second Semester</b>		
ENGR 1000 or ENGS 1000	Introduction to Engineering Technology or Introduction to Engineering	2
		<b>Credit Hours</b>
		<b>2</b>
<b>Third Semester</b>		
CADT 1100	Introduction to AutoCAD	3
CIMN 1110	Machining Processes	3
		<b>Credit Hours</b>
		<b>6</b>
<b>Fourth Semester</b>		
MECT 1150	Technical Communications	3
		<b>Credit Hours</b>
		<b>3</b>
<b>Fifth Semester</b>		
CADT 1500	Advanced AutoCAD	3
CIMN 2240	Jig and Fixture Design	2
		<b>Credit Hours</b>
		<b>5</b>
<b>Sixth Semester</b>		
CIMN 1210	Materials Processing	3
		<b>Credit Hours</b>
		<b>3</b>
		<b>Total Credit Hours</b>
		<b>22</b>