

# Lakeland

COMMUNITY COLLEGE

PROGRAM GUIDE

## Applied Studies Division

# Computer Integrated Manufacturing Technology

- Associate of Applied Science Degree in Computer Integrated Manufacturing
- Maintenance and Repair Concentration
- CNC Operator Mini Certificate
- CNC Set-Up and Programming Technology Certificate
- Computer Integrated Manufacturing Technology Certificate
- Industrial Computer Hardware Technician Certificate
- Production Shift Leader/ Manufacturing Management Certificate
- Tool and Die Technology Certificate
- Tool Room/Maintenance Machinist Certificate

 Opportunity  
starts **HERE**  
[lakelandcc.edu](http://lakelandcc.edu)

# Computer Integrated Manufacturing Technology



Manufacturing industries are strong suppliers of products and goods across the United States and in global markets. Many companies are looking for trained employees for a variety of positions. The program offered at Lakeland strives to meet those needs and funnel many qualified employees into manufacturing jobs.

## Career Opportunities

Today's manufacturing industry is highly computerized and advanced. Mills and factories have gone from hand-held machinery to high-tech, specialized computer programs and robotics that do the projects. It takes highly trained and qualified people to perform the requirements needed in the manufacturing industry today. Northeast Ohio shows very strong job growth in this area and some companies are having difficulties finding enough employees to fill open positions.

## Lakeland's Program

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.

The maintenance and repair concentration prepares graduates for repairing and maintaining equipment in an industrial environment.

There are also several certificates available that students can choose to supplement their learning.

## The Lakeland Advantage

- Classes meet today's technology requirements for the manufacturing industry.
- Faculty members have years of experience working for local companies and update the courses and equipment to keep up with the latest industry trends.
- Students receive hands-on experience to meet or exceed the requirements of today's manufacturing companies.
- Scholarships may be available to those who qualify.

## Lakeland Community College Admission Requirements

For admission into Lakeland, students must be a high school graduate or have obtained a high school diploma equivalency. Please consult Lakeland Community College's Enrollment Guide (available on Lakeland's website at [lakelandcc.edu/enrollment](http://lakelandcc.edu/enrollment)) for specific admissions requirements and procedures.

## For more information

1.800.589.8520 • [lakelandcc.edu](http://lakelandcc.edu)

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## 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. The Maintenance and Repair Concentration also offers an option for becoming a mechanical maintenance and repair technician at ArcelorMittal Cleveland.














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.**


## 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>		
CADT 1100	Introduction to AutoCAD 	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	Introduction to Engineering Technology	2
FYEX 1000	First Year Experience	1
MATH 1080	Introduction to Technical Mathematics	4
	Credit Hours	16
<b>Second Semester</b>		
CIMN 1210	Materials Processing 	3
COMM 1000 or COMM 1100	Effective Public Speaking or Effective Interpersonal Communications	3
MATH 1180	Technical Mathematics I	4
MECT 1150	Technical Communications	3
MECT 1600	Geometric Dimensioning and Tolerancing 	2
PHYS 1200	Applied Physics Heat and Thermodynamics	3
	Credit Hours	18
<b>Third Semester</b>		
CADT 2100	Introduction to SolidWorks 	3
CIMN 2190	Manufacturing Methods and Costs 	3
CIMN 2240	Jig and Fixture Design 	3
PHYS 1100	Applied Physics Mechanics	3
<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
	Credit Hours	16
<b>Fourth Semester</b>		
CIMN 1450	Programming CNC Lathes 	2
CIMN 1460	Programming CNC Machining Centers 	2
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
	Credit Hours	15
	Total Credit Hours	65

<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
GEOG 2500	World Cultural 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/>.

The ArcelorMittal Endorsed Option for the Maintenance and Repair Concentration (ArcelorMittal Steelworker for the Future Program) is for students wanting a career as a maintenance technician mechanical at ArcelorMittal Cleveland. The Steelworker for the Future program is a partnership with Lakeland Community College, ArcelorMittal Cleveland, and the United Steelworkers Local 979 designed to prepare students for successful careers as mechanical maintenance or electrical maintenance technicians in the steel industry. Steelworker for the Future is an estimated 2.5-year program that includes four semesters of classroom training, plus up to 16 weeks of paid on-the-job (co-op) training at ArcelorMittal Cleveland for students who pass the company's hiring requirements. Students will earn an Associate of Applied Science (AAS) degree and can be eligible for hire at ArcelorMittal upon completion of the program. (Students are not required to work for ArcelorMittal, nor are they guaranteed employment at ArcelorMittal.) For more information about the program and to apply go to <http://steelworkerforthefuture.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
	Credit Hours	16
<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
	Credit Hours	17
<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
	Credit Hours	15
<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
	Credit Hours	16
	Total Credit Hours	64



- 1 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).
- 3 The co-op experience(s) with a company in the AWT will have a maximum of 2 credits.
- 4 There are two co-op experiences, each with ArcelorMittal, for a maximum of 2 credits.
- 5 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) Welding 	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 	3
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
GEOG 2500	World Cultural 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	2
CIMN 1420	Computer Numerical Control Part Programming (CNC)	2
CIMN 1450	Programming CNC Lathes	2
CIMN 1460	Programming CNC Machining Centers	2
ENGR 1000	Introduction to Engineering Technology	2
Total Credit Hours		13

## 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 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
MATH 1080	Introduction to Technical Mathematics	4
MECT 1150	Technical Communications	3
Total Credit Hours		26

## Computer Integrated Manufacturing Technology Certificate (4311)

Course	Title	Credit Hours
CADT 1100	Introduction to AutoCAD	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	3
ENGR 1000	Introduction to Engineering Technology	2
MATH 1080	Introduction to Technical Mathematics	4
MECT 1150	Technical Communications	3
Total Credit Hours		28



## 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 1200	Visual Basic for Engineering Technology I	2
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 2070	Installing and Configuring Windows 10	2
Total Credit Hours		15

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

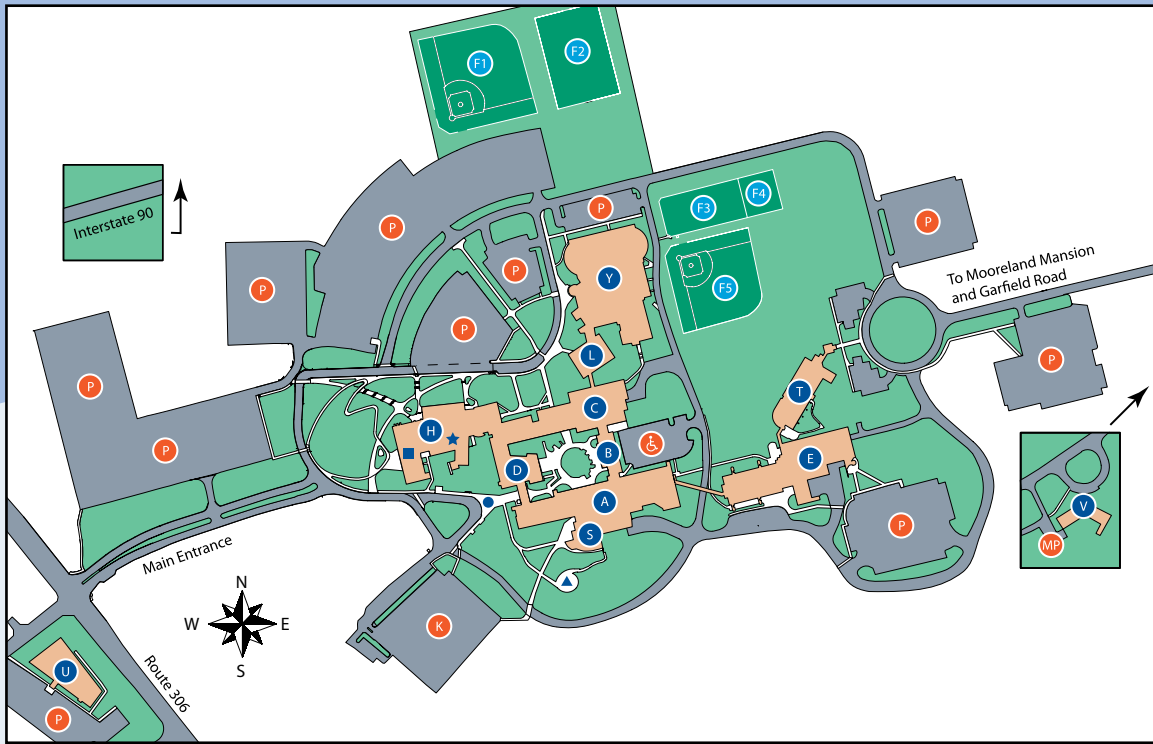
Course	Title	Credit Hours
BUSM 1300	Introduction to Business	3
BUSM 1800	Essentials of Management and Supervision	3
BUSM 2200	Organizational Behavior	3
CADT 1100	Introduction to AutoCAD	3
CIMN 1110	Machining Processes	3
CIMN 1210	Materials Processing	3
CIMN 2190	Manufacturing Methods and Costs	3
ENGR 1000	Introduction to Engineering Technology	2
MATH 1080	Introduction to Technical Mathematics	4
MECT 1150	Technical Communications	3
Total Credit Hours		30

## Tool and Die Technology Certificate (4303)

Course	Title	Credit Hours
<b>First Semester</b>		
CIMN 1050	Manufacturing Fundamentals	2
	Credit Hours	2
<b>Second Semester</b>		
ENGR 1000	Introduction to Engineering Technology	2
MATH 1080	Introduction to Technical Mathematics	4
	Credit Hours	6
<b>Third Semester</b>		
CADT 1100	Introduction to AutoCAD	3
CIMN 1110	Machining Processes	3
	Credit Hours	6
<b>Fourth Semester</b>		
MECT 1150	Technical Communications	3
MECT 1600	Geometric Dimensioning and Tolerancing	2
	Credit Hours	5
<b>Fifth Semester</b>		
CADT 1500	Advanced AutoCAD	3
CIMN 2240	Jig and Fixture Design	3
	Credit Hours	6
<b>Sixth Semester</b>		
CIMN 1210	Materials Processing	3
	Credit Hours	3
	Total Credit Hours	28

## Tool Room/Maintenance Machinist Certificate (4302)

Course	Title	Credit Hours
<b>First Semester</b>		
MATH 1080	Introduction to Technical Mathematics	4
	Credit Hours	4
<b>Second Semester</b>		
ENGR 1000	Introduction to Engineering Technology	2
	Credit Hours	2
<b>Third Semester</b>		
CADT 1100	Introduction to AutoCAD	3
CIMN 1110	Machining Processes	3
	Credit Hours	6
<b>Fourth Semester</b>		
CIMN 1210	Materials Processing	3
	Credit Hours	3
<b>Fifth Semester</b>		
CIMN 1420	Computer Numerical Control Part Programming (CNC)	2
	Credit Hours	2
<b>Sixth Semester</b>		
CIMN 1450	Programming CNC Lathes	2
CIMN 1460	Programming CNC Machining Centers	2
	Credit Hours	4
	Total Credit Hours	21



### CAMPUS MAP

**A** A-Building  
**B** B-Building  
**C** C-Building  
**D** D-Building  
**E** E-Building  
**F1** Baseball Field  
**F2** Soccer Field  
**F3** Tennis Courts  
**F4** Multi-Purpose Court

**F5** Softball Field  
**H** H-Building  
**K** Faculty Staff Lot  
**L** Teaching Learning Center  
**P** Parking  
**S** Student Service Center/  
Breakers Dining  
**T** T-Building  
**U** Holden University Center

**V** Mooreland Mansion  
**Y** Athletic & Fitness Center  
 ● Clocktower  
 ★ Dental Hygiene Clinic  
 ♿ Handicap Parking  
 ■ HIVE  
 ▲ Mind Ladders

### Quality Education

Professors at Lakeland are experts in their fields with real-world experience. Lakeland prepares you for a high-demand career or for transfer to a four-year college or university. Access to bachelor's and graduate degrees is available on campus from partner institutions through Lakeland's Holden University Center ([lakelandcc.edu/uc](http://lakelandcc.edu/uc)).

### Affordable Tuition

Lakeland's tuition is about one-third the cost of most four-year schools. More than 50 percent of Lakeland students receive some form of financial assistance ([lakelandcc.edu/tuition](http://lakelandcc.edu/tuition)).

### Convenience

Lakeland offers convenient day, evening, weekend and online courses ([lakelandcc.edu/schedule](http://lakelandcc.edu/schedule)).

### Focus on Students

Lakeland offers a variety of student services to help you succeed, such as counseling, tutoring, computer labs, career services, free parking and affordable child care.

## Opportunity starts HERE

**Visit** us on campus or online. Call 440.525.7900, email [recruitmentcenter@lakelandcc.edu](mailto:recruitmentcenter@lakelandcc.edu) or visit [lakelandcc.edu/visit](http://lakelandcc.edu/visit) for a campus tour.

**Apply** online: [lakelandcc.edu/apply](http://lakelandcc.edu/apply)

### Accreditation

Lakeland Community College is accredited through the Higher Learning Commission (HLC) and participates in the Academic Quality Improvement Program (AQIP). The Higher Learning Commission, 230 South LaSalle Street, Suite 7-500, Chicago, IL 60604-1413, phone: 800.621.7440, [hlcommission.org](http://hlcommission.org).

**Lakeland**  
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