

# MECHATRONICS TECHNOLOGY - MICRO- ELECTROMECHANICAL SYSTEMS, ONE-YEAR TECHNICAL CERTIFICATE

Curriculum Code #6510

Effective May 2022

Division of Engineering, Business and Information Technologies (<http://catalog.lorainccc.edu/academic-programs/engineering-business-information-technologies/>)

The micro-electromechanical systems (MEMS) one-year technical certificate is structured to provide students with the knowledge and skills necessary to work as an entry-level technician. Training is provided in the fundamental concepts of micro-electromechanical systems and how these devices are designed and fabricated. The student will learn and apply principles in actual cleanroom activities. The program will utilize state-of-the-art laboratory facilities containing equipment for testing, troubleshooting, calibrating, analyzing and designing electronic and MEMS systems. Every course in the one-year technical certificate can be applied to the two-year associate of applied science degree in the MEMS major of the mechatronics program. Lorain County Community College has articulation agreements with colleges and universities including programs offered by Lorain County Community College's University Partnership.

## First Year

Fall Semester		Hours
ELCT 111	ELECTRICAL CIRCUITS I	3
ELCT 115	FABRICATION PROCESS FOR ELECTRONICS	2
MEMS 122	INTRODUCTION TO MICRO-ELECTROMECHANICAL SYSTEMS (MEMS)	4
MTHM 155	TECHNICAL MATHEMATICS I	4
SDEV 101	INTRODUCTION TO THE LCCC COMMUNITY <sup>2</sup>	1
TECN 111	TECHNICAL PROBLEM SOLVING	3
<b>Hours</b>		<b>17</b>

## Spring Semester

CADD 111	INTRODUCTION TO COMPUTER AIDED	2
CADD 216	INTRODUCTION TO 3D MODELING AND PRINTING	1
DFAB 111	INTRODUCTION TO PERSONAL FABRICATION <sup>1</sup>	1
ELCT 121	DIGITAL ELECTRONICS	4
ENGL 161	COLLEGE COMPOSITION I	3
MEMS 132	MEMS PACKAGING <sup>1</sup>	3
Select one of the following:		3

Arts and Humanities Elective

Social Sciences Elective	17
<b>Hours</b>	
<b>Total Hours</b>	<b>34</b>

<sup>1</sup> Indicates that this course has a prerequisite.

<sup>2</sup> A student must register for the orientation course when enrolling for more than six credit hours per semester or any course that would result in an accumulation of 13 more credit hours.

<sup>3</sup> Indicates that this course requires a prerequisite or may be taken concurrently.

## Arts and Humanities Electives

Code	Title	Hours
ARTS 243G	ART HISTORY I	3
ARTS 244G	ART HISTORY II	3
ARTS 245G	WORLD ART	3
ARTS 246	HISTORY OF PHOTOGRAPHY	3
ARTS 254	HISTORY OF AMERICAN ARCHITECTURE	3
ENGL 251	AMERICAN LITERATURE I	3
ENGL 252	AMERICAN LITERATURE II	3
ENGL 253G	INTRODUCTION TO WORLD LITERATURE	3
ENGL 254G	INTRODUCTION TO HISPANIC LITERATURE	3
ENGL 255G	INTRODUCTION TO FICTION	3
ENGL 257G	INTRODUCTION TO POETRY	3
ENGL 259G	INTRODUCTION TO DRAMA	3
ENGL 261G	MASTERPIECES OF BRITISH LITERATURE I	3
ENGL 262G	MASTERPIECES OF BRITISH LITERATURE II	3
ENGL 266G	AFRICAN AMERICAN LITERATURE	3
ENGL 269G	INTRODUCTION TO SHAKESPEARE	3
HUMS 151G	INTRODUCTION TO HUMANITIES	3
HUMS 261G	INTRODUCTION TO GREAT BOOKS: ANCIENT WORLD TO THE RENAISSANCE	3
HUMS 262G	INTRODUCTION TO GREAT BOOKS: EARLY MODERN TO THE 20TH CENTURY	3
HUMS 271G	INTRODUCTION TO MYTHOLOGY	3
HUMS 274	FILM APPRECIATION	3
MUSC 262G	MUSIC AS A WORLD PHENOMENON	3
PHLY 165	BIOETHICS	3
PHLY 262G	INTRODUCTION TO EASTERN PHILOSOPHY	3
RELG 181G	INTRODUCTION TO WORLD RELIGIONS	3
RELG 261	RELIGION IN AMERICA	3
RELG 262G	INTRODUCTION TO EASTERN PHILOSOPHY	3
THTR 151G	INTRODUCTION TO THEATER	3

## Social Science Electives

Code	Title	Hours
HSTR 151G	CIVILIZATION I	3
HSTR 152G	CIVILIZATION II	3
HSTR 161	UNITED STATES I	3
HSTR 162	UNITED STATES II	3

HSTR 171G	THE WORLD SINCE 1900	3
HSTR 252G	WOMEN IN WORLD HISTORY	3
HSTR 267G	AFRICAN AMERICAN HERITAGE	3
PLSC 156	AMERICAN NATIONAL GOVERNMENT	3
PSYH 151	INTRODUCTION TO PSYCHOLOGY	3
SOCY 151G	INTRODUCTION TO SOCIOLOGY	3

Program Contact(s):

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For information about admissions, enrollment, transfer, graduation and other general questions, please contact your advising team (<https://www.lorainccc.edu/admissions-and-enrollment/advising-and-counseling/>).

More program information can be found on our website. (<https://www.lorainccc.edu/engineering/mechatronics/micro-electromechanical-systems-mems-one-year-certificate/>)

**Program Learning Outcomes**

1. An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve well-defined engineering problems appropriate to the discipline of microelectronics and MicroElectroMechanical Systems (MEMS).
2. An ability to design solutions for well-defined technical problems and assist with the engineering design of systems, components, or processes appropriate to the discipline of microelectronics and MEMS.
3. An ability to apply written, oral, and graphical communication in well-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature.
4. An ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results.
5. An ability to function effectively as a member of a technical team.

**Objectives**

An creditable program will prepare graduates with technical skills necessary for entry into industry of the manufacturing, inspecting, testing, rework, and troubleshooting of PCB and related microelectronic products. Graduates of the one year certificate are expected to use skills and techniques in the knowledge of equipment operations, assembly, testing, and troubleshooting of prototyping a PCB and associated microelectronic components.

**Program Educational Objectives**

1. Use technical skills, techniques, tools and equipment in the field of microelectronics and microsystems.
2. Recognize industry standard terminology materials and processes related to microelectronic manufacturing.

3. Assemble and perform verifications such as inspection, testing, and rework of functioning printed circuit boards



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*The Ohio Manufacturing Workforce Partnership (OMWP) is a collaboration of The Ohio Manufacturers' Association (OMA) and Ohio TechNet (OTN). Established to address Ohio's manufacturing workforce shortage, the OMWP works directly with a statewide network of manufacturing industry sector partnerships and is focused on meeting local employment and skill needs.*

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