

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

Curriculum Code #6510

Effective May 2024

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, microelectronics, semiconductor wafers, electronic printed circuit board (PCB) hardware, and how these devices are manufactured 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 manufacturing, testing, troubleshooting, calibrating, analyzing and designing electronic hardware, microelectronics, 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 |
| MEMS 124 | PRINTED CIRCUIT BOARD TEST & TROUBLESHOOTING ³ | 3 |
| MTHM 155 | TECHNICAL MATHEMATICS I | 4 |
| SDEV 101 | INTRODUCTION TO THE LCCC COMMUNITY ² | 1 |
| Hours | | 17 |

Spring Semester

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|----------|--|---|
| CADD 111 | INTRODUCTION TO COMPUTER AIDED DRAFTING ³ | 2 |
| CADD 216 | INTRODUCTION TO 3D MODELING AND PRINTING | 1 |
| DFAB 111 | INTRODUCTION TO PERSONAL FABRICATION | 1 |
| ELCT 121 | DIGITAL ELECTRONICS ¹ | 4 |
| ENGL 161 | COLLEGE COMPOSITION I | 3 |
| MEMS 132 | MEMS PACKAGING ¹ | 3 |

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|---|--------------------------------------|-----------|
| MEMS 134 | THRU-HOLE MANUFACTURING ³ | 2 |
| Select one of the following: | | 3 |
| Arts and Humanities Elective ⁴ | | |
| Social Sciences Elective ⁵ | | |
| Hours | | 19 |
| Total Hours | | 36 |

1

Indicates that this course has a prerequisite.

2

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.

3

Indicates that this course requires a prerequisite or may be taken concurrently.

4

Select any Arts and Humanities Ohio Transfer 36 (<http://catalog.lorainccc.edu/academic-information/transfer-module-requirements/>) course.

5

Select any Social Science Ohio Transfer 36 (<http://catalog.lorainccc.edu/academic-information/transfer-module-requirements/>) course.

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/>)

Credit for Prior Learning (PLA) options may be available for your program. For more information, please visit our website: www.lorainccc.edu/PLA (<http://www.lorainccc.edu/PLA>)

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 accreditable 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