MECHATRONICS TECHNOLOGY - MICRO-ELECTROMECHANICAL SYSTEMS (MEMS), ASSOCIATE OF APPLIED SCIENCE

Curriculum Code #6520

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) major 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, 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 manufacturing, testing, troubleshooting, calibrating, analyzing and designing electronic hardware, microelectronics, and MEMS systems. 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		
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
MEMS 132	MEMS PACKAGING [1]	3
MEMS 134	THRU-HOLE MANUFACTURING [3]	2
MTHM 168	STATISTICS [1]	3
	Hours	**16**
Second Year		
Fall Semester		
CHMY 171	GENERAL CHEMISTRY I	5
ELCT 233	ELECTRONIC DEVICES I [1, 3]	4
ENGL 161	COLLEGE COMPOSITION I	3
MEMS 211	SEMICONDUCTOR PROCESSING [1, 3]	3
MEMS 287	WORK-BASED LEARNING I - MEMS [4]	1
	Hours	**16**
Spring Semester		
ENGL 164	COLLEGE COMPOSITION II WITH TECHNICAL TOPICS [1]	3
MEMS 221	MICRO-SYSTEM CAPSTONE PROJECT [1, 3]	3
MEMS 288	WORK-BASED LEARNING II - MEMS [1, 4]	1
Arts and Humanities Elective [5]		3
Social Sciences Elective [6]		3
	Hours	**13**
	Total Hours	**62**

1

Indicates that this course requires 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 or more credit hours.

3

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

4

This course offers an opportunity for experiential learning - student must be first employed within their field of study before taking this class.

5

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

6

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/associate-of-applied-science-in-mechatronics-technology-micro-electromechanical-systems-mems/)

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. Apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve well-defined problems engineering problems appropriate to the discipline of microelectronics and MicroElectroMechanical Systems (MEMS).

2. 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. 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. Conduct standard tests, measurements, and experiments and to analyze and interpret the results.

5. Function effectively as a member of a technical team.

6a. Demonstrate knowledge, techniques, skills, and use of modern equipment in materials and manufacturing processes.

6b. Demonstrate knowledge, techniques, skills, and use of modern equipment in
manufacturing engineering technology specific to product design process, tooling, and assembly.

6c. Demonstrate knowledge, techniques, skills, and use of modern equipment in
manufacturing engineering technology specific to manufacturing systems, automation, and operations.

6d. Demonstrate knowledge, techniques, skills, and use of modern equipment in
manufacturing engineering technology specific to statistics, quality and continuous improvement, and industrial organization and management.

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 associate degree programs are expected to have strengths in the knowledge of equipment operations, assembly, testing, and troubleshooting of prototyping a PCB and associated microelectronic components with introductory skills in PCB design of schematic and layout.

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
4. Successfully complete a paid internship demonstrating professional and
technical responsibilities to working as a part of an engineering team in a quality manufacturing environment.