History

1. Jul 22, 2018 by Cecilia Balut (cbalut)
2. Jul 28, 2018 by Shawna Giovannazzo (sgiovann)
3. Sep 16, 2018 by Cecilia Balut (cbalut)

Viewing: MEMS 122 : INTRODUCTION TO MICRO-ELECTROMECHANICAL SYSTEMS (MEMS)

Last approved: Sun, 16 Sep 2018 10:54:02 GMT

Last edit: Tue, 09 Aug 2022 19:03:08 GMT

Is this a fast track change?
No

Course ID
108568

Subject
MEMS - Micro-Electromechanical Systems

Course Number
122

Title
INTRODUCTION TO MICRO-ELECTROMECHANICAL SYSTEMS (MEMS)

Division
Engineering Technologies

Effective Term
Spring 2023

Method of Delivery
Blended
In Person

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.

This workforce product was funded by a grant awarded by the U.S. Department of Labor's Employment and Training Administration. The product was created by the recipient and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership. This product is copyrighted by the institution that created it.

Typically Offered
Offered Fall and Spring Terms

CIP Code
15.0613 - Manufacturing Engineering Technology/Technician.

SOC Code

Standard Occupational Classification (SOC)	Standard Occupational Classification Title
17-3026	Industrial Engineering Technicians

Course Level
Technical

Is this an international course?
No

Grading Basis
Graded

Grading Procedures

Graded Element	% of overall course grade
Laboratory Exercises	40
Assignments / Quizzes / Exams	40
Final Exam	20

Upload Sample Syllabus

Course Hours

Minimum Credit Hours
4

Maximum Credit Hours
4

Is this course repeatable for credit?

No

Course Components

Lecture
Laboratory

Component Hours, ILUs, and Seats

Lecture:

Contact Hours
3
ILUs
3
Seats
24

Laboratory:
Contact Hours
3
ILUs
2.55
Seats
24

Total Course Contact Hours
6

Special Fees

Special Fee
Yes

Type of Fee
Supplies/Materials
Amount
30.00

Catalog Information

Crosslisted

Course Description
The course introduces the theory, terminology, application, and hands-on industry practices of the emerging field of microelectronic manufacturing. Topics include: hand soldering and rework of surface mount technology on printed circuit boards, hand dexterity practices of hand-soldering millimeter scale components, manufacturing of printed circuit boards, semiconductor integrated circuits, and microelectromechanical system sensors, integration of MEMS electronic products, and good electronic manufacturing practices.

Prerequisite
None

Corequisite
None

Concurrent
None

Course Placement Policy
None

Topical Outline: Please enter each of the Topical Outline items as a bullet.

- *MEMS and Microelectronics – History, Theory, Terminology, and Applications*
- *Introduction to working in an ESD preventative, quality control, class 10,000 cleanroom manufacturing environment with a focus of product on-time delivery*
- *Introduction to assembling, manufacturing, and reworking printed circuit boards (PCB) by using soldering irons and hot-air rework stations.*
- *Industry standards of PCB processing – Soldering, inspection, testing, and rework*
- *Introduction to microelectronic and MEMS manufacturing processes*
    - *Silicon wafer processing – handling, cleaning, & photolithography*
    - *Packing – die attach, thermosonic wire bonding, & encapsulation*
    - *CAE and CAD – Schematics and Layout*
    - *Electronic assembly – stencil printing, SMT pick & place, & solder reflow*
- *Microelectronic Assembly Processes*

College Ready Requirement

English

Reading

Math

Course Outcomes and Assessment

Outcome Number:
1

Outcome
Explain terminology, processes, materials, and standards used in the manufacturing, testing, and application of microelectronic products.

Domain
Cognitive

Assessment Tools
Examination

Assessment Method
Rubric

Benchmark %
70% of students will earn 70% or higher on selected instrument

Benchmark %

Other Benchmark

Corresponding GE Outcomes

C1 English
C3 Science
In1 Critical Thinking

Outcome Number:

2

Outcome

Assemble a functional microelectronic PCB using standard PCB manufacturing equipment, processes, and materials.

Domain

Psychomotor

Assessment Tools

Laboratory exercise

Assessment Method

Rubric

Benchmark %

70% of students will earn 70% or higher on selected instrument

Benchmark %

Other Benchmark

Corresponding GE Outcomes

C1 English
C2 Mathematics
C3 Science
In1 Critical Thinking

Outcome Number:

3

Outcome

Modify an electronic product requiring repair/rework with microelectronic components to a working state.

Domain

Cognitive

Assessment Tools

Laboratory exercise

Assessment Method

Rubric

Benchmark %

70% of students will earn 70% or higher on selected instrument

Benchmark %

Other Benchmark

Corresponding GE Outcomes

C1 English
C2 Mathematics
C3 Science
In1 Critical Thinking

Outcome Number:

4

Outcome

Perform in a quality manufacturing environment with focus on product on-time delivery.

Domain

Affective

Assessment Tools

Laboratory exercise

Assessment Method

Rubric

Benchmark %

70% of students will earn 70% or higher on selected instrument

Benchmark %

Other Benchmark

Corresponding GE Outcomes

C1 English
C2 Mathematics
C3 Science
In1 Critical Thinking

General Education/Other

Type of Course

General Education
Technical

Core Course Outcomes

Core Course Outcomes

Infused Course Outcomes

Infused Course Outcomes
In1 Critical Thinking: Employ critical thinking skills in addressing issues and problems.

Experiential Learning

Does this course have an experiential component?
No

Suggested Instructional Method(s) and Technique(s)
Lectures: Explanation of concepts and applications
Demonstration: Presentation of analysis techniques
Lab Exercises: Practice of manufacturing in a lab environment.

State Articulation and Transfer

Transfer Module:
None

Transfer Assurance Guide and Career Technical Credit Transfer

Accreditation/Licensure/Certification

Does this course prepare or substantially prepare a student for a license or certification? Note: This section applies to an individual course that may have a certification and/or licensure. (e.g. CPR course)

No

Additional Resources

Additional Resources

Other Materials

Required Materials
Specified by Instructor - Materials provided by the instructor from a variety of current sources.

Optional Materials

Additional Notes

Notes
8/9/2022 - JDV - Changing outcomes for ABET and based on recommendations from advisory committee.

Rationale

Rationale and Dean's Statement of Support
requested of KZ 2022

Attach Additional Support Documentation

Reviewer Comments
Cory Williams (cwilliam) (Wed, 07 Sep 2022 19:09:13 GMT): Rollback: Needs additional work

Key: 1695

Select any proposals you would like to bundle together for approval. Only proposals you have saved are available to bundle.

Bundle Title:

Course: Proposal A Program: Proposal B