Washtenaw Community College Comprehensive Report

MEC 224 Mechatronics Capstone
Effective Term: Fall 2022

Course Cover

College: Advanced Technologies and Public Service Careers
Division: Advanced Technologies and Public Service Careers
Department: Advanced Manufacturing
Discipline: Mechatronics
Course Number: 224
Org Number: 14430
Full Course Title: Mechatronics Capstone
Transcript Title: Mechatronics Capstone
Is Consultation with other department(s) required: No
Publish in the Following: College Catalog , Time Schedule , Web Page
Reason for Submission: Three Year Review / Assessment Report
Change Information:
    Consultation with all departments affected by this course is required.
    Course title
    Course description
    Pre-requisite, co-requisite, or enrollment restrictions
    Outcomes/Assessment
    Objectives/Evaluation
Rationale: We are updating the master syllabus with newer content so that we can assess it.
Proposed Start Semester: Fall 2022
Course Description: In this course, students will demonstrate the knowledge accumulated from the entire Mechatronics program. Students will be working around industrial equipment safely and integrating automated systems. Students will integrate industrial automated systems as well as design and document a simple robotic workcell. The title of this course was previously Robotics IV.

Course Credit Hours

Variable hours: No
Credits: 4
Lecture Hours: Instructor: 30 **Student:** 30
Lab: Instructor: 60 **Student:** 60
Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 90 **Student:** 90
Repeatable for Credit: NO
Grading Methods: Letter Grades
Audit
Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

Requisites

Prerequisite
ELE 224 minimum grade "C"
and
Prerequisite
NCT 120 minimum grade "C"
and
Prerequisite
ROB 221 minimum grade "C"

General Education

Request Course Transfer
Proposed For:

Student Learning Outcomes

1. Work with a robotic workcell in accordance with industry safety standards
   Assessment 1
      Assessment Tool: Outcome-related practical lab
      Assessment Date: Fall 2023
      Assessment Cycle: Every Three Years
      Course section(s)/other population: All sections
      Number students to be assessed: All students
      How the assessment will be scored: Departmentally-developed check sheet with rubric
      Standard of success to be used for this assessment: 75% of students will score 75% or higher.
      Who will score and analyze the data: Departmental faculty
   Assessment 2
      Assessment Tool: Outcome-related questions on the final exam
      Assessment Date: Fall 2023
      Assessment Cycle: Every Three Years
      Course section(s)/other population: All sections
      Number students to be assessed: All students
      How the assessment will be scored: Answer key
      Standard of success to be used for this assessment: 75% of students will score 75% or higher.
      Who will score and analyze the data: Departmental faculty

2. Document a robotic workcell.
   Assessment 1
      Assessment Tool: Outcome-related questions on the final exam
      Assessment Date: Fall 2023
      Assessment Cycle: Every Three Years
      Course section(s)/other population: All sections
      Number students to be assessed: All students
      How the assessment will be scored: Answer key
      Standard of success to be used for this assessment: 75% of students will score 75% or higher.
      Who will score and analyze the data: Departmental faculty
   Assessment 2
      Assessment Tool: Outcome-related practical lab
      Assessment Date: Fall 2023
      Assessment Cycle: Every Three Years
      Course section(s)/other population: All sections
      Number students to be assessed: All students
      How the assessment will be scored: Departmentally-developed check sheet with rubric
      Standard of success to be used for this assessment: 75% of students will score 75% or higher.

Who will score and analyze the data: Departmental faculty

3. Integrate an industrial robot with other automated systems.

Assessment 1

Assessment Tool: Outcome-related questions on the final exam

Assessment Date: Fall 2023

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Answer key

Standard of success to be used for this assessment: 75% of students will score 75% or higher.

Who will score and analyze the data: Departmental faculty

Assessment 2

Assessment Tool: Outcome-related practical lab

Assessment Date: Fall 2023

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Departmentally-developed check sheet with rubric

Standard of success to be used for this assessment: 75% of students will score 75% or higher.

Who will score and analyze the data: Departmental faculty

Course Objectives

1. Safely and correctly perform electrical wiring.
2. Safely and correctly work around an industrial robot.
3. Safely and correctly work around other automated systems.
4. Read and create flowcharts.
5. Read and create electrical diagrams.
6. Comment and document robot and programmable logic controller (PLC) programs.
7. Integrate an industrial robot with a PLC.
8. Interface an industrial robot with surrounding equipment.
9. Interface a PLC with surrounding equipment.

New Resources for Course

Course Textbooks/Resources

Textbooks

Manuals

Periodicals

Software

Equipment/Facilities

Reviewer	Action	Date
Faculty Preparer:		
Sean Martin	*Faculty Preparer*	*Feb 08, 2022*
Department Chair/Area Director:		
Allan Coleman	*Recommend Approval*	*Feb 08, 2022*
Dean:		
Jimmie Baber	*Recommend Approval*	*Feb 09, 2022*
Curriculum Committee Chair:		
Randy Van Wagnen	*Recommend Approval*	*Mar 01, 2022*

Assessment Committee Chair:

Shawn Deron   *Recommend Approval*   *Mar 03, 2022*

Vice President for Instruction:

Kimberly Hurns   *Approve*   *Mar 04, 2022*

MEC 224 Robotics IV
Effective Term: Fall 2014

Course Cover

Division: Advanced Technologies and Public Service Careers
Department: Industrial Technology
Discipline: Mechatronics
Course Number: 224
Org Number: 14430
Full Course Title: Robotics IV
Transcript Title: Robotics IV
Is Consultation with other department(s) required: No
Publish in the Following: College Catalog , Time Schedule , Web Page
Reason for Submission: New Course
Change Information:
   Consultation with all departments affected by this course is required.
   Course discipline code & number
   Outcomes/Assessment
Rationale: Conditionally-approved course seeking full approval.
Proposed Start Semester: Fall 2014
Course Description: In this course, students will learn about advanced programming of robots and programmable controllers in an integrated work cell. Problems related to maintenance and trouble-shooting constitute a major segment of the course. A group project involving the design and construction of a work cell that simulates some industrial process is an enjoyable conclusion to this course. This course contains materials previously taught in ROB 224.

Course Credit Hours

Variable hours: No
Credits: 4
Lecture Hours: Instructor: 30 **Student:** 30
Lab: Instructor: 60 **Student:** 60
Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 90 **Student:** 90
Repeatable for Credit: NO
Grading Methods: Letter Grades
Audit
Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math
Requisites

Prerequisite
ROB 223 minimum grade "C"

General Education
Request Course Transfer

Proposed For:

Student Learning Outcomes

1. Design and construct a work cell (robotic device and process) in accordance with industry and safety standards.
   Assessment 1
   Assessment Tool: Capstone project
   Assessment Date: Winter 2015
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Departmentally-developed rubric
   Standard of success to be used for this assessment: 75% of the students will score 75% or higher.
   Who will score and analyze the data: Departmental faculty

Course Objectives

1. Correctly use at least one industrial robot.
   Matched Outcomes
   1. Design and construct a work cell (robotic device and process) in accordance with industry and safety standards.
2. Perform effective and efficient robot programming.
   Matched Outcomes
   1. Design and construct a work cell (robotic device and process) in accordance with industry and safety standards.
3. Document robot programming.
   Matched Outcomes
   1. Design and construct a work cell (robotic device and process) in accordance with industry and safety standards.
4. Safely and correctly perform electrical wiring.
   Matched Outcomes
   1. Design and construct a work cell (robotic device and process) in accordance with industry and safety standards.
5. Document electrical wiring.
   Matched Outcomes
   1. Design and construct a work cell (robotic device and process) in accordance with industry and safety standards.
6. Perform effective and efficient PLC programming.
   Matched Outcomes
   1. Design and construct a work cell (robotic device and process) in accordance with industry and safety standards.
7. Document PLC programming.
   Matched Outcomes
   1. Design and construct a work cell (robotic device and process) in accordance with industry and safety standards.
8. Interface robot with surrounding equipment.
   Matched Outcomes
   1. Design and construct a work cell (robotic device and process) in accordance with industry and safety standards.
9. Demonstrate effective use of teamwork.
   Matched Outcomes
   1. Design and construct a work cell (robotic device and process) in accordance with industry and safety standards.
10. Demonstrate creativity in design.
    Matched Outcomes
    1. Design and construct a work cell (robotic device and process) in accordance with

industry and safety standards.
11. Demonstrate effective troubleshooting.
   Matched Outcomes
      1. Design and construct a work cell (robotic device and process) in accordance with industry and safety standards.
12. Recognize and apply safety standards.
   Matched Outcomes
      1. Design and construct a work cell (robotic device and process) in accordance with industry and safety standards.

New Resources for Course
Course Textbooks/Resources
Textbooks
Manuals
Periodicals
Software
Equipment/Facilities

Reviewer	Action	Date
Faculty Preparer:		
Thomas Penird	Faculty Preparer	Mar 21, 2014
Department Chair/Area Director:		
Thomas Penird	Recommend Approval	Mar 21, 2014
Dean:		
Marilyn Donham	Recommend Approval	Apr 03, 2014
Vice President for Instruction:		
Bill Abernethy	Approve	Apr 25, 2014