

## Lansing Community College

### Course Cover Sheet



#### M-CAM Training Area:

CNC/Machining  Multi-Skilled Mechatronics  Production Operation  Welding/Fabrications

**Program(s):** Intro to Mechatronics Block 1-3

**Course:** Block 2 Capstone Evaluation

#### Course Description:

Using the skills learned in Block 2 of Lansing Community College's AMTEC Mechatronics program, students will safely develop and execute a correction process, listing components that need to be adjusted, replaced or repaired. Student must have successfully completed all prerequisites, lessons and labs in the following subjects before starting this Capstone:

- Basic Electrical (107X)
- Fluid Power and Electrohydraulic/Pneumatics (101X)
- Mechanical Systems/Mechanical Drives/Power Transmissions (108X)
- Controls and Instrumentation (106X)

The instructor will initiate a series of four different faults into the system: Fluid Power fault, Electrical fault, Mechanical fault, part feed or orientation. The student will have a specified amount of time to develop, describe, and execute a troubleshooting and correction process. After discussion with the instructor, the student will correct the problem(s), then write and present a report documenting the process and solution(s) used to correct the problem(s). Delivery method is face-to-face.

**Date Created:** June, 2016.

**Employer/Industry Partner:** Magna/DexSys, Lansing, Michigan and various manufacturing companies in Mid-Michigan.

**Faculty Developer(s)/Instructional Designer(s):** Sidney Mosley/Ann Lapo

**College Contact:** Jill Doederlein

**Phone:** 517.483.9665

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**Additional Information/Comments:** Hands-on capstones were designed to solidify learning for an entire block of courses and potentially showcase students' projects to employers. Capstones may also be used as prerequisites to programs/courses to offer students an opportunity to "test out" of required courses.

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## MECHATRONICS BLOCK 2 CAPSTONE TROUBLESHOOTING PROJECT

### OVERVIEW:

Using the skills learned in Block 2 of Lansing Community College's AMTEC Mechatronics program, students will safely develop and execute a correction process, listing components that need to be adjusted, replaced or repaired. Make sure you have successfully completed all prerequisites, lessons and labs in the following subjects before starting this Capstone:

- Basic Electrical (107X)
- Fluid Power and Electrohydraulic/Pneumatics (101X)
- Mechanical Systems/Mechanical Drives/Power Transmissions (108X)
- Controls and Instrumentation (106X)

The instructor will initiate a series of four different faults into the system: Fluid Power fault, Electrical fault, Mechanical fault, part feed or orientation. The student will have a specified amount of time to develop, describe, and execute a troubleshooting and correction process. After discussion with the instructor, the student will correct the problem(s), then write and present a report documenting the process and solution(s) used to correct the problem(s).

**ESTIMATED TIME REQUIREMENTS:** 4-6 hours

### OBJECTIVES:

After completing this project, the student should be able to:

- Demonstrate all safety practices pertaining to this project.
- Use schematics, prints, and test equipment to locate, identify and analyze system faults.
- Create a troubleshooting process.
- Accurately diagnose root cause problem(s).
- Develop a correction plan.
- Discuss the correction plan with the instructor.
- Fix the problem(s) satisfactorily while exhibiting appropriate work habits and professionalism.
  - a. The student's solution must be safe, durable, functional, load appropriate, and reliable.
- Write a report documenting the problems, troubleshooting process, repairs and adjustments made.
- Present the report to the instructor or a small panel of educators and employers.

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Location: Center for Manufacturing Excellence (CME)

Equipment/Materials needed:

- FESTO-MPS equipment
- AMTEC Simulator (Trainer)
- Computer with Microsoft Word and Internet connection.

**Procedure:** Part 1 – Troubleshooting (Time Requirement: 2-3 hours)

1. Get the System Information Package (schematics, cycle, description, fluid power diagrams, mechanical specifications, component specifications) from the instructor.
2. Discuss the time frame and procedure of the project with the instructor, clarifying any questions you have.
3. Get the necessary test equipment and computer resources (Use of the Internet is permitted).
4. Develop a troubleshooting plan.
5. Identify system problems based on troubleshooting results.
6. Develop an action plan to correct the problems identified.
7. **In Microsoft Word:** Document the problems: Write your troubleshooting process and correction plan.
8. CHECK-IN WITH INSTRUCTOR BEFORE PROCEEDING:
  - Present your plan to the instructor.
  - Upload your correction plan to the Dropbox on the D2L site after approval from the instructor.

Instructor Approval of plan: \_\_\_\_\_

Date/Time: \_\_\_\_\_

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**Procedure:** Part 2 – Correct the Problem (Time Requirement: 2-3 hours)

1. Correct the problems.
2. Present your solutions to the instructor.
3. Write a report documenting the problems, troubleshooting process, repairs and adjustments made.
  - Present your report to the instructor (or a small panel of educators and employers).
  - Upload your report to the Dropbox on the D2L site after approval.

Final Instructor Approval: \_\_\_\_\_

Date/Time: \_\_\_\_\_

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### Subject Matter Expert (SME) Course Review Summary

**College:** Lansing Community College

**M-CAM Training Area:** CNC/Machining Multi-Skilled/Mechatronics Production Operation Welding/Fabrication

**Degree Program Name:**

**Title of Course:** AMTEC Block 2 Capstone

#### Subject Matter Expert (SME) Reviewer Information

**Name:** Robert C. Hess

**Title:** Senior Instructional Designer/Trainer

**Phone:** 566-322-1033

**Email:** bob.hess@mhtechnologies.net

**Organization/Affiliation:** MH Technologies

**Attach Resume or provide credentials (showing years of experience and work experience that is relevant to course content):**

#### Synopsis of Findings:

1. Document is missing.

Reviewers Signature \_\_\_\_\_ Robert C. Hess \_\_\_\_\_

Date: 3/8/17

**Michigan Coalition for Advanced Manufacturing  
Subject Matter Expert Course Review**

1. Course Overview and Objectives	Exceptional	Satisfactory	Ineffective
The goals and purpose of the course is clearly stated.		X	
Prerequisites and/or any required competencies are clearly stated.		X	
Learning objectives are specific and well-defined.		X	
Learning objectives describe outcomes that are measurable.		X	
Outcomes align to occupational focus (industry skills and standards).		X	
Comments or recommendations:			
2. Material and Resources	Exceptional	Satisfactory	Ineffective
The instructional materials contribute to the achievement of the course learning objectives.		X	
The materials and resources meet/reflect current industry practices and standards.		X	
The instructional materials provide options for a variety of learning styles.		X	
Resources and materials are cited appropriately. If applicable, license information is provided.		X	
Comments or recommendations:			
3. Learning Activities	Exceptional	Satisfactory	Ineffective
Provide opportunities for interaction and active learning.		X	
Help understand fundamental concepts, and build skills useful outside of the learning object.		X	
Activities are linked to current industry practices and standards.		X	

**Michigan Coalition for Advanced Manufacturing  
Subject Matter Expert Course Review**

Comments or recommendations:			
<b>4. Assessment Tools/Criteria for Evaluation</b>	<b>Exceptional</b>	<b>Satisfactory</b>	<b>Ineffective</b>
The course evaluation criteria/course grading policy is stated clearly on syllabus.		X	
Measure stated learning objectives and link to industry standards.		X	
Align with course activities and resources.		X	
Include specific criteria for evaluation of student work and participation.		X	
Comments and recommendations:			
<b>5. Equipment/Technology</b>	<b>Exceptional</b>	<b>Satisfactory</b>	<b>Ineffective</b>
Meets industry standards and needs.		X	
Supports the course learning objectives.		X	
Provides students with easy access to the technologies required in the course/module.		X	
Comments and recommendations:			

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# Robert C. Hess

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Shelby Twp., MI 48317  
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## Qualifications

Dedicated, articulate, and enthusiastic with strong analytical and organizational abilities. Effective communication and interpersonal skills. Ability to work independently or as an integral part of a team to accomplish goals. Experience prioritizing and completing numerous concurrent responsibilities while meeting time and organizational goals. Sound professional attitude, strong work ethic and pride in personal performance.

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## Experience

**2015 – Present**                      **M H Technologies LLC**                      **Warren, MI**  
**Senior Instructional Designer/Trainer**

- Perform Needs Analysis and quote training programs
- Develop on-line training programs, system manuals, student workbooks, and job aids
- Deliver on-site training programs

**2002 – 2015**                      **R.C. Technologies**                      **Shelby Twp. MI**  
**Business Owner – R.C. Technologies**

- Research and quote training programs
- Development of training programs for Ford Motors, DaimlerChrysler, General Motors, Kuka Robotics, Fame Conveyor, Lamb Technicon, Delphi, Magna, and SPX
- Design training programs, system manuals, student workbooks, PowerPoint presentations, and job aids
- Deliver on-site training programs
- Professional Industrial photography

**1995 – 2002**                      **DCT Inc.**                      **Sterling Heights, MI**  
**Training Designer**

- Research and quote training programs
- Design training programs, system manuals, student workbooks, and job aids
- Deliver on-site training programs

**1990 – 1995**                      **Bond Robotics**                      **Sterling Heights, MI**  
**Training Manager / Field Service Engineer**

- Managed Training Department
- Research and quote training programs
- Design operation and maintenance manuals plus training guides
- Deliver all training programs
- Perform on-site electrical and mechanical customer support for installation, start-up, and debugging of pressroom automation

**1986 – 1990**                      **Robotic Vision Systems, Inc.**                      **Sterling Heights**  
**Field Service Engineer / Trainer**

- Research, installation, programming and training of 3D vision guided robotic welding and sealant systems for military, aerospace, and automotive industry

**Education**                      **1977 – 1981**                      **Ferris State University**                      **Big Rapids, MI**

- BSEE