

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 1 Capstone Evaluation

Course Description:

Using the skills learned in Block 1 of the AMTEC Mechatronics program, students will safely reverse engineer, sketch/dimension, and machine a small brass head hammer from the sample provided.

Delivery method is face-to-face.

Date Created: January, 2016.

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

Faculty Developer(s)/Instructional Designers(s): Gregg Butts/Ann Lapo

College Contact: Jill Doederlein

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Additional Information/Comments: Due to the increased need to offer a flexible delivery format to meet the needs of students'/workers' busy schedules, LCC partnered with AMTEC (Automotive Manufacturing Technical Education Collaborative) led by Kentucky Community Technical College to offer open entry open exit modular courses in a hybrid format (lessons online and hands-on labs with an instructor on campus). LCC instructors added content based on the needs of local industry. 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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AMTEC Block 1 Capstone: Brass Hammer Project

OVERVIEW:

Using the skills learned in Block 1 of the AMTEC Mechatronics program, students will safely reverse engineer, sketch/dimension, and machine a small brass head hammer from the sample provided.

Make sure you have successfully completed all lessons and labs in the following modules before starting this Capstone:

- Computer Literacy
- Safety
- Print Reading/Schematics
- Machine Tool Operations

TIME REQUIREMENTS: 6-8 hours

OBJECTIVES:

After completing this Lab Exercise, the student should be able to:

- Using precision and semi-precision measuring tools, obtain sizes, angles, and features of a sample hammer.
- Sketch the components of the sample hammer full scale, including all dimensional features such as linear, angles, diameters, holes, threads, chamfers, counter bores.
- Create a part based on a drawing with required dimensions.
- Write and Save a short document using Microsoft Word.
- Upload a file to Desire2Learn's Capstone 1 Dropbox for the course.

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Supplies needed:

- Prototype Hammer
- Precision and Semi-Precision measuring tools
- Drawing or Graph paper
- Drafting supplies (pencils, erasures, rulers, triangles, etc.)
- 1" x 1" brass stock
- 1" diameter CRS stock
- Various cutting tools for the Lathe, Drill Press, and Milling machine
- Computer with Microsoft Word and Internet connection.

Procedure: Part 1 (Time Requirement: approximately 2 hours)

1. Get the sample brass head hammer from the instructor.
2. Using precision and semi-precision measuring tools, obtain sizes, angles, and features of the prototype hammer (Hammer can be disassembled.)
3. Sketch the components of the hammer on your drafting sheet(s), full scale, including all dimensional features such as linear, angles, diameters, holes, threads, chamfers, counter bores, etc.
4. **In Microsoft Word:** Write your plan of procedure for machining the components on the lathe, mill, etc. Save and print it. You will be presenting this plan to the instructor before proceeding.
5. CHECK-IN WITH INSTRUCTOR BEFORE PROCEEDING:
 - Present your sketch to the instructor
 - Present your plan of procedure to the instructor
 - Upload your final plan of procedure to the Dropbox on the D2L site.

Instructor Approval of plan: _____

Date/Time: _____

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Procedure: Part 2 (Time Requirement: 3-4 hours)

1. Acquire the stock for the hammer by cutting the material needed with the horizontal band saw.
2. Create the hammer handle profile based on your drawing with the lathe.
 - a. Length dimensions should be within .015" of your dimensioned sketch.
 - b. Diameters should be within .005" of your dimensioned sketch.
3. Thread the external thread of the handle to its correct pitch with a die.
4. Create the hammer head based on your drawing with the knee mill.
 - a. All dimensions should be within .005" of your dimensioned sketch.
 - b. Precision angles may be used to mill angled features.
5. Create the hole, counter bore, and internal threads on the hammer head, based on your drawing, with either the knee mill or drill press.
 - a. Threads should be hand tapped.
6. Deburr all sharp edges.
7. Assemble hammer
8. Turn in final project with sketches and plan of procedure to your instructor.

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: Mechatronics Block 1 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 good for verifying student knowledge of the modules.

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:			
4. Assessment Tools/Criteria for Evaluation	Exceptional	Satisfactory	Ineffective
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:			
5. Equipment/Technology	Exceptional	Satisfactory	Ineffective
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.

Experience

- | | | |
|--|-------------------------------------|--|
| 2015 – Present | M H Technologies LLC | Warren, MI |
| Senior Instructional Designer/Trainer | | |
| <ul style="list-style-type: none">• 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 | | |
| <ul style="list-style-type: none">• 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 | | |
| <ul style="list-style-type: none">• 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 | | |
| <ul style="list-style-type: none">• 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 | | |
| <ul style="list-style-type: none">• 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 |
| | | <ul style="list-style-type: none">• BSEE |