EDMM 1500
Introduction to Manufacturing

COURSE SYLLABUS

2018-2019 Catalog Data:

Analysis and application of a broad range of modern manufacturing techniques utilized in industry. Exploration of production methods as influenced by historical impact, materials, processes, productivity, ethics, and social/environmental concerns. The global challenges to product design, performance, quality, and economic considerations will be investigated.

Prerequisites by topic: none

Textbooks: none

Course Coordinator: Dr. Paul Engelmann, Professor, Engineering Design, Manufacturing and Management Systems Department. Office: F-214 Parkview, (269) 276-3348, paul.engelmann@wmich.edu

Course Objectives	Performance Criteria (department)[1] Course	ABET/TAC Outcomes[2]
1. To understand the importance of manufacturing in a global society.	(J2) Identify the historical, contemporary, and potential future significance of manufacturing on global society.	j
2. Define key process variables that contribute to the quality of manufactured products.	(A4) Correctly identify important processing variables that contribute the quality products produced by a given manufacturing process.	a
3. To understand the impact of process and materials selection on productivity.	(K3) Identify factors associated with industrial materials and process selection that impact productivity of a given product.	k
4. Correctly identify the manufacturing process used to produce a given product.	(D4) Determine an appropriate process with which to produce a product, through consideration of the product's design attributes.	d
5. Differentiate among the tooling requirements for products based upon manufacturing process used.	(A1) Explain why the magnitude of tooling is required for each of the manufacturing processes.	a

Performance Criteria[1]: EDMMS performance criteria may be found at http://www .wmich.edu/edmms
ABET/TAC Outcomes[2]: Outcomes may be found at http://www.abet.org/

Evaluation:

1.	Product evaluation report	10%
2.	Quizzes	6%
3.	Attendance	6%
4.	Test 1	25%
5.	Test 2	25%
6.	Final exam	28%
		100%

The grading scale for this course is as follows:

93-100 = A
89- 92 = BA
83-88 = B
79-82 = CB
73-78 = C
69-72 = DC
63-68 = D
<62 = E

WEEK OF	*LECTURE TOPICS*	*ASSIGNMENTS*
Week 1	Course introduction Milestones in Manufacturing	
Week 2	Dimensional Metrology	Meet with group to choose item to disassemble and evaluate
Week 3	Properties of Materials Metals, Ceramics & Wood	Watch videos on steelmaking and wood processing Item to disassemble and evaluate **Due**
Week 4	Sheet metal forming Drawing and Forging	Watch videos on sheet metal forming & forging *E-L extra credit videos **Due**
Week 5	Metal Extrusion **Test 1**	Watch videos on extrusion
Week 6	Metal Casting Processes	Watch videos on metal casting Photos of disassembled item to be and evaluated **Due**
Week 7	Welding Joining Processes	Watch videos on welding *S-Z extra credit videos **Due**
Week 8	Polymers Plastics Processing	Watch videos on plastics processing
Week 9	**Test 2** Traditional Machining Processes	Watch videos on machining
Week 10	Non-Traditional Machining Processes	Watch videos non-traditional machining *A-D extra credit videos **Due**
Week 11	Finishing Processes	Watch videos on finishing processes
Week 12	Additive Manufacturing Processes Powdered Metals	Product Disassembly and Evaluation Report **Due** Watch videos on additive manufacturing
Week 13	Glass & Ceramics Processing Production Considerations	Videos TBD
Week 14	Final review & synthesis	Videos TBD *M-R extra credit videos **Due**
Week 15	Comprehensive Final Exam	

*First letter of student's last name

Product Disassembly and Evaluation

The class has been divided into 3-4 person teams. You will analyze a product by disassembling and looking at each of the components that make up the device. This allows you to evaluate the **methods** and **materials** that were selected.

Product choice: Your team should obtain an item or device that contains between 15 and 40 components. You may use something you currently have or can get from family or friends. If you must purchase something, it should not exceed $20. Places like Goodwill Industries or second-hand stores may provide something inexpensive. In general the item will no longer work at the end of the project, so look for something that is already, outdated, unused or broken. Think of something small. Many staplers, old calculators, dead laptop chargers, old power strips, remote controls, broken small appliances or power tools have at least 15 parts.

Specifications: If there are multiple components that are the same (such as 4 screws), you may still count each one toward the minimum. Some parts may be permanently installed, such as the plug prongs in a grounded cord or a resister soldered to a circuit board. You may still count the resister and the circuit board as two separate components if you need to meet the minimum components count. If you have more than 15 components, you may count a circuit board as a single item and do not need to analyze each component on the board. However, things that connect the board to something should be

counted as separate components i.e. USB port, wire, battery holder, switch, etc. However, any electric motor contained in a device must be disassembled.

Your tasks:

1. Take a photograph of **your 3-4 person team with the item** you have chosen and upload copy of the photo to Elearning Drop Box. Images from the internet are not acceptable.
2. Disassemble the product. Note: It is not necessary to deconstruct any circuit boards.
3. Take a photograph of the **disassembled item or device** and upload it to Drop Box.
4. Photograph the components, either individually or in groups, with each component or set of identical components numbered for reference in your report.
5. Your report should discuss the following:
   - Materials: Determine what material(s) are used for each component.
   - Manufacturing processes: Determine the process(es) used to produce each component.
   - Determine what, if any, finishing process(es) were applied to each component.

Evaluating and collecting data: Conduct research on materials and processes. Be very specific; **do not just guess** at things. At least one member of each group is in EDMM 1501 and will be spending time in various laboratories and can get assistance/advice with the product disassembly as needed. In addition, you have lots of resources: the internet, the company that made the product, your professor, other professors and people knowledgeable in manufacturing and materials. You must **explain how** you determined each process and each material and **cite the resource you used** to draw your conclusions in the report.

Your Report

- Present your findings in a written report of 1500 words or less (approximately 3 pages of text).
- Include the names of all group members along with the name of the product that you disassembled on the first page of the report.
- Include a photograph of your assembled on the first page of the report.
- Embed photographs of the product's components within the report adjacent to the paragraphs that describe them.
- Tables or other graphics may also be used, as necessary.
- All photographs, tables or graphics must be given a figure number and referenced in the document.
- You must have a reference list at the end of your report and the references should be cited in the report.
- Staple your report in the upper right hand corner.
- Do not use a report binder or folder.

Usage of Electronic Devices during Class

Cell phones are to be turned off or set to vibrate. They are to be placed either at the front of your desk or in a back pack or purse. Surfing the web, sending email, text messaging, talking on a cell phone, listening to an iPod or Mp3 player in class is prohibited. People wishing to use a laptop computer to take notes must sit in the front row of the class.

Academic Honesty

You are responsible for making yourself aware of and understand the University policies and procedures that pertain to Academic Honesty. These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse. The academic policies addressing Student Rights and Responsibilities can be found in the Undergraduate Catalog at http://catalog.wmich.edu/content.php?catoid=24&navoid=974.

If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Conduct. You will be given the opportunity to review the charge(s) and if you

believe you are not responsible, you will have the opportunity for a hearing. You should consult with your instructor if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test.

You must make yourself aware of and abide by the "Western Michigan University Sexual and Gender-Based Harassment and Violence, Intimate Partner Violence, and Stalking Policy and Procedures" related to prohibited sexual misconduct under Title IX, the Clery Act and the Violence Against Women Act (VAWA) and Campus Safe. Under this policy, responsible employees (including instructors) are required to report claims of sexual misconduct to the Title IX Coordinator or designee (located in the Office of Institutional Equity). Responsible employees are not confidential resources**.** For a complete list of resources and more information about the policy see www.wmich.edu/sexualmisconduct. In addition, students are encouraged to access the Code of Conduct, as well as resources and general academic policies on such issues as diversity, religious observance:

- Office of Student Conduct www.wmich.edu/conduct
- Division of Student Affairs www.wmich.edu/students/diversity
- Registrar's Office www.wmich.edu/registrar and www.wmich.edu/registrar/policies/interfaith

Academic Accommodation:

Any student registered with Disability Services for Students (DSS) who would like to discuss accommodations for this class should contact the instructor of record in a timely manner. Students with documented disabilities who are not registered with DSS should call the office at (269) 387-2116 or visit www.wmich.edu/disabilityservices. Students cannot request academic accommodations without scheduling an appointment and meeting with a DSS staff member. If a student does not register with DSS, their academic accommodations/modifications cannot be executed.

Expectations for Attendance and Participation:

Excused Absences

Each student is allowed to miss two (2) class periods without being penalized. These two (2) excused absences are provided as a buffer against family problems, weather, job and class conflicts. WMU does not wish to have any student attend class if they suspect that they have the flu. Please email your instructor immediately to determine how a quiz or test will be handled. The student is responsible for all missed materials and **should review at least two other class members' notes** for lectures missed.

Unexcused Absences

If more than two (2) classes are missed, a doctor's note or other documentation is required or the absence will be considered unexcused. Your grade will be reduced for each unexcused absence.

Participation

You are expected to participate as an equal member of your project team. Failure to do so will result in redistribution of the points for Product Evaluation Report grade among the team members.

Late Assignments

Late assignments will be docked a substantial amount. An assignment over 1 week late will require Dr. Engelmann to determine if the assignment will be accepted.

Prepared by: Paul Engelmann Date: March 2018