

The IME 100 Trophy - The Design Project for IME 100 Fall 2015
Due Friday December 11, 2015
right before the clock strikes midnight for the 12th

Background

IME 100 is a unique Introduction to Engineering based on Manufacturing and Design. Wouldn't it be great if every student who completed this course had a kind of trophy to take with them to celebrate their completion of this course. The trophy would be "made" of all "parts" made by students in the practica and design studios.

The "trophy" will incorporate as many of the following as possible: hardness test, tensile test, sheet metal, casting, machining, electronic circuit from ECE lab, joining (welding, brazing, and soldering), polymer processing, powder processing, additive manufacturing, and assembly. Further it would have to lend itself to the ME Design Sequence - Reverse Engineering, Bill of Materials etc.

There are two options:

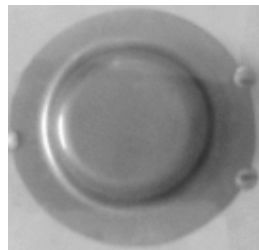
1. Keeping the practica sequence as is; but changing the parts to be made.
2. Changing both the practica sequence and changing the parts to be made.

As with any design/innovation project; you are encouraged to "think out of the box". For example consider the following.

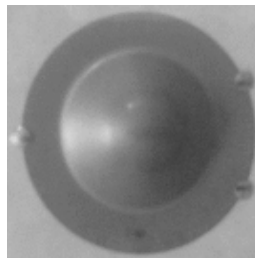
Sheet Metal Practica

Different Shapes Can be Made

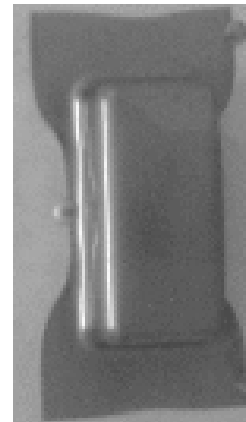
Think about how the part made in the sheet metal practica can be combined with other parts.



Cup



Dome

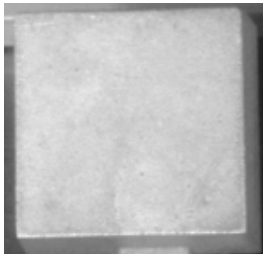


Square Box

Casting Practica

Various Parts Can be Made in the Green Sand Casting Practica. As you decide what should be made in the Casting Practica think of the importance of

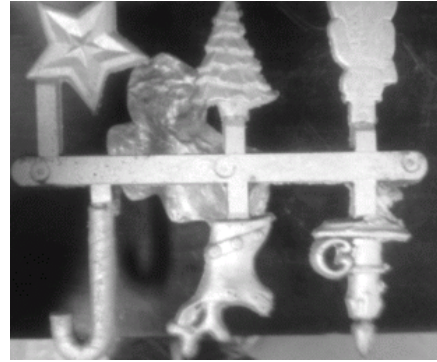
- Machining what was Cast
- Joining what was Cast to something later
- Both the Green Sand and Lost Foam Practica
- Are both Necessary?



Some of You Made Blocks



Some Made Bulldogs



It is Possible to Have Multiple Shapes on One Casting

There is No Reason that Different Practica cannot be Added; However we cannot increase their number (recommending increasing the term length is not practical)



We Have the Capability to Add a Powder Practica, Where Everyone Would Make a Bulldog or Other Part

Ending with an Assembly/Production Planning/Work Design Practica is Also a Possibility. If You Feel a Wood or Other Base Is Needed, and May Have to Be Purchased Separately You Can Make That Recommendation.

Consider other options (the list below is not exhaustive)

- Should an Additive Manufacturing Practica be added?
- Should another Practica be added?
- Is it necessary to have 2 machining practica and 2 welding practica?
- Are there any practica that should be eliminated or reduced in scope?

Suggestions on How to Successfully Complete the Project

There are 3 key steps to Project Management (which is key to completing Projects).

- A Project Scope (what is in and what is out) must be clearly defined.
- A Work Breakdown Structure - which identifies necessary tasks must be developed.
- A Schedule based on the Work Breakdown Structure must be developed.

Project Scope Development	
<u>What is In</u>	<u>What is Out</u>
<ul style="list-style-type: none"> • An Assembled Trophy must be made. • Modifying What is Done in Each Practica • Eliminating 1 week of a 2 week Practica • Adding new Practica • Better connecting the Design Labs to the Practica and Class-Sessions. 	<ul style="list-style-type: none"> • Eliminating both Parts of a 2 week Practica Sequence • Increasing the Number of Practica • Increasing the Time to Complete each Practica • Eliminating the Design-Labs
<p>Project Scope: Design a Kettering Trophy would be “made” of all (or maximum possible) “parts” made by students in the practica and design studios. It must be possible to make all parts to be created in the practica within 9 2hr sessions (note this could include assembly). The same is true about the Design Labs. The following will be considered when designing the Kettering Trophy.</p> <ul style="list-style-type: none"> • Adding new Practica • Better connecting the Design Labs to the Practica and Class-Sessions. • Eliminating 1 week of a 2 week Practica • Modifying What is Done in Each Practica 	

Development of Work Breakdown Structure - Tasks which Must Be Completed

Project Scope: Design a Kettering Trophy would be “made” of all (or maximum possible) “parts” made by students in the practica and design studios. It must be possible to make all parts to be created in the practica within 9 2hr sessions (note this could include assembly). The same is true about the Design Labs. The following will be considered when designing the Kettering Trophy.

- Adding new Practica
 - Better connecting the Design Labs to the Practica and Class-Sessions.
 - Eliminating 1 week of a 2 week Practica
 - Modifying What is Done in Each Practica
-

The Following List might not Include all Steps Especially with Regard to Copying/Pasting

1. Each Team Member Submits Initial Concept
2. Team Member Copies and Pastes Appropriate Content into Review Pages
3. Review of Initial Concepts
4. Submitters Revise Concepts based on Reviews if Necessary
5. Someone enters appropriate information into “Compare the Concepts” of “Concept Generation”
6. Team Member Copies and Pastes Appropriate Content into First Round Ballot.
7. Team Members vote to Identify Best Two Initial Concepts
8. Initial NABC Statements Submitted
9. Review of Initial NABC Statements Completed
10. Draft NABC Statements Submitted
11. Review of Draft NABC Statements Completed
12. Draft Value Proposition Submitted
13. Review of Draft Value Proposition Completed
14. Final Value Proposition Completed
15. Final Design Completed
16. Improvement and Optimization Completed
17. Improvement and Optimization Recorded (Copy/Paste)
18. Prototype Reviews for Improvement and Optimization Completed
19. Reason for Rejecting First Concept Recorded
20. Reasons for Accepting Two Concepts to Move Forward Recorded.
21. Prototype Completed
22. Best Initial Concept Determined
23. Initial Proposal Prepared
24. Possible Critical Challenges Named
25. Critical Challenges Identified
26. Solutions to Critical Challenges Accepted
27. Notes for Development of Prototype Recorded
28. Two Concepts to Be Further Considered (with possible revisions) Submitted
29. Appropriate Copying and Pasting of Two Concepts to Be Further Considered
30. Voting for Best Initial Concept Completed
31. Project Submitted to Professor

Development of Possible Schedule: This is usually a step by step process where one moves backward estimating time needed for each step or activity. A draft is below. Note this took 17 iterations to develop. I will make the Excel Workbook available for review.

Description	Date
Each Team Member Submits Initial Concept	12/1/15 4:59:59PM
Team Member Copies and Pastes Appropriate Content into Review Pages	12/1/15 4:59:59PM
Review of Initial Concepts	12/2/15 4:59:59PM
Someone enters appropriate information into "Compare the Concepts" of "Concept Generation"	12/3/15 4:59:59PM
Team Member Copies and Pastes Appropriate Content into First Round Ballot.	12/3/15 4:59:59PM
Submitters Revise Concepts based on Reviews if Necessary	12/3/15 4:59:59PM
Appropriate Copying and Pasting of Two Concepts to Be Further Considered	12/4/15 4:59:59PM
Two Concepts to Be Further Considered (with possible revisions) Submitted	12/4/15 4:59:59PM
Reasons for Accepting Two Concepts to Move Forward Recorded.	12/4/15 4:59:59PM
Reason for Rejecting First Concept Recorded	12/4/15 4:59:59PM
Team Members vote to Identify Best Two Initial Concepts	12/4/15 4:59:59PM
Best Initial Concept Determined	12/5/15 4:59:59PM
Initial Proposal Prepared	12/6/15 4:59:59AM
Possible Critical Challenges Named	12/7/15 4:59:59AM
Critical Challenges Identified	12/7/15 4:59:59PM
Solutions to Critical Challenges Accepted	12/8/15 4:59:59AM
Notes for Development of Prototype Recorded	12/8/15 7:59:59AM
Prototype Completed	12/8/15 7:59:59AM
Improvement and Optimization Recorded (Copy/Paste)	12/9/15 7:59:59AM
Improvement and Optimization Completed	12/9/15 7:59:59AM
Final Design Completed	12/9/15 8:59:59AM
Initial NABC Statements Submitted	12/10/15 8:59:59AM
Review of Initial NABC Statements Completed	12/10/15 8:59:59PM
Draft NABC Statements Submitted	12/11/15 4:59:59AM
Review of Draft NABC Statements Completed	12/11/15 10:59:59AM
Draft Value Proposition Submitted	12/11/15 4:59:59PM
Review of Draft Value Proposition Completed	12/11/15 8:59:59PM
Final Value Proposition Completed	12/11/15 10:59:59PM
Project Submitted to Professor	12/11/15 11:59:59PM

