

ME 110 - Final Project Guidelines**Fall 2000**

Introduction

The final project is an opportunity to put all the things you've learned about manufacturing processes in ME 110 into practice by designing, planning the manufacturing process for, and actually manufacturing a part or device of your choosing. The goal of this project is to integrate the knowledge and skill you've gained in manufacturing processes and apply them in a practical way.

You may carry out this assignment either individually or in a group composed of others from your laboratory section. In all cases you must obtain prior approval for both the project and makeup of the group from your instructor before beginning. (See the dates and deliverables below)

Definition of the Project

Your project must involve the manufacture and assembly of more than one part. Each person in the group must have the responsibility to manufacture and/or assemble at least one of the parts making up the project. Your project can certainly contain parts that have been purchased, but you should manufacture the key elements.

–Make sure that you limit the scope of what you choose to do in this assignment! In other words, don't bite off more than you can chew. It will turn out better in the end if you do an excellent job on a simpler project, rather than doing an incomplete or poor job on a more complex project. Little or no partial credit will be given for a project that is not completed. You will have about 5 lab periods in which to manufacture and assemble your final project. You can use the previous laboratory assignments as a gauge to indicate what is realistic to expect to be able to accomplish in one laboratory period.

If you are at a loss as to what to do for the project, see your instructor or your lab instructor for ideas.

Project Report Guidelines

Your project report must contain the following elements:

- Description of the artifact
Explain the background and intended use for the artifact you produced. Basically you want to answer the questions: "What is your artifact used for? And, "Why did you choose this project?"
- Detail drawings
Each part and assembly must have a detail drawing including all views, dimensions, tolerances, material callout, finish requirements, etc necessary to be able to fabricate the part. These drawings must be done using a CAD system. Each part must have a unique part number and be dated. Any changes made to the parts after the detail drawings have been submitted to the instructor must be documented by an engineering change order and updated prints must be generated.
- Manufacturing process plan
Each part and assembly must have a detailed process plan that lists the manufacturing equipment and processing steps needed for its fabrication and assembly. Your plan should be separated into two sections: plans that document the manufacturing process you used in the shop and plans for the process that would be used to produce the artifact in high volumes. Unless otherwise directed by your instructor, use production quantities of 100,000 per year to guide your selection of manufacturing processes.

For example, one of the parts in your artifact may be milled out of aluminum bar stock. However, in volume production, milling the part like you did in the shop may not be the most efficient or

lowest cost way to produce a functionally equivalent part. Casting might be the preferred method.

- Cost estimate
Develop an estimate for what it will cost to produce 100,000 each of the artifact per year (or other quantity as directed by your instructor).
- Description of individual contribution
The report must include a one page description by each team member that describes in detail his or her contribution to the completion of the project.

A Suggested Process for Completing This Assignment

1. Select team members.
2. Decide on a team leader. The team leader should oversee the project and make sure that tasks are completed on time.
3. Choose a meeting time, other than class time, when the team will meet on a regular basis to keep the project moving.
4. Lay out a schedule for the project and divide up the work to be done among the team members.
5. Develop at least 5 (different) concepts for selection from. [Note: “develop” means make a few simple hand sketches of the concept, and write a brief description about each sketch.] Rank concepts in order of preference.
6. Submit concepts and descriptions to your instructor for approval per the assignment schedule.
7. After your instructor has approved the concept, make detail drawings of parts using a CAD system of your choice.
8. Submit detail drawings per the assignment schedule
9. Plan the manufacturing process for each part
10. Submit manufacturing process plans per the assignment schedule.
11. Procure materials and components.
12. Fabricate and assemble parts
13. Develop production cost estimates. This step may be one of the most challenging aspects of this project. The manufacturing process used to produce your artifact in volume production may be vastly different than how you made it in the shop. You will have to use what you know about manufacturing processes to select the most cost-effective approach. This may also require design changes to accommodate the best manufacturing process.
14. Prepare the final report.

Notes on the assignment:

1. The major portion of the project must be made of metal or plastic.
2. Each team member must be involved with the development of concepts. Each concept drawing must have the name of the team member who produced it written on it.
3. The shop can provide limited materials for this project. Consequently, your group will have to come up with the bulk of what you need to manufacture your project.
4. All work must be completed in the labs at SJSU unless for some extraordinary circumstance fabrication at SJSU is impossible. In such a rare case, *prior* approval must be obtained from the instructor.
5. All safety and lab management procedures must be followed during lab periods devoted to project

work.

6. Do not count on extra time for the labs to be open for the completion of the project. Plan accordingly!
7. The last class period will be a project fair, where each team will informally present the results of their project to the rest of the class. The final report will also be due on this day.

Grading Criteria

Grading of the project will be carried out using the following criteria:

- **Concept (10%)** Your artifact will be judged on its technical merits, including innovation, appropriate use of manufacturing methods, materials, etc.
- **Adherence to Schedule (10%)** Your team will be evaluated on how well you managed your schedule and met the target dates for deliverables
- **Implementation into Hardware (30%)** Your artifact will be judged on the quality of workmanship and appearance of the finished artifact. Do the dimensions of the finished parts meet the specifications spelled out in the drawings? Are there dents, scratches, burrs, etc? Does the artifact function as intended?
- **Quality of the Report (30%)** Your report will be judged on its completeness and quality. How well does your report document the artifact that you designed, analyzed, and manufactured? How clear is it? Are the drawings complete and reliable? How well could someone follow the process planning material and what you have written to reproduce the artifact? How reliable are the cost estimates for production? Etc.
- **Individual Contribution (20%)** This aspect will address the quality of each group member's contribution to the outcome of the assignment. It will also include an evaluation of how well you followed the safety and laboratory management procedures

Schedule for Final Project Deliverables

Dates	Deliverables
9-25-00	Submit names of team members to Prof. Furman
10-2-00	Submit 5 (different) concepts of possible projects to Prof. Furman
10-16-00	Submit detail drawings of parts to Prof. Furman
10-23-00	Submit process plans to Prof. Furman
10-30-00	Begin fabrication of project in the shop
11-20-00	Submit cost estimate for production quantities
12-11-00	Project Fair and submission of final report