Project:
The objective of this project is to create a set of working drawings for an existing product. The deliverables for the project are:

- A set of working drawings (assembly drawings, detail drawings and a parts list.)
- A presentation of your project to the class in a six minute presentation during the last class period of the semester.
- A teaching handout for the class containing information about a new topic in solid modeling or engineering graphics pertaining to your project that you will discuss in your presentation.
- As with any real world project, you are to document all project activities by creating a Project Log. The Project Log must contain a record of all the activities associated with your project. This includes things like a Gantt chart, progress report memos, time sheets, etc.

Possible Project Ideas Include:
- Table Saw, Band Saw etc.
- Leatherman Tool
- Injection Mold
- Halogen Work lamp
- Payloader
- Zippo Lighter
- Any other project in which you have an interest.

Project Size Requirements:
- Your product must contain a minimum of FIVE component parts. The maximum number of component parts is dictated by the amount of time available to complete the project.
- When choosing a project, assume that the time required is three class-weeks for each member of the three person group or about 90 man-hours total for the project. This number is ten hours per week times three weeks duration times three people per group. We are assuming that you will spend at least one hour outside of class for every in-class hour.
- Each project must have a characteristic that requires you to learn something new in Pro/E or engineering graphics. This may include animation, helix, weld symbols, etc.
- Avoid products that have multi-curved surfaces or really complex geometry that may require more modeling skills than have been covered in this course and METBD 110. This may include the ever popular toy cars and planes, etc.
- Standard parts (motors, fasteners, nuts, washers, springs, bearings, gears, etc.) are to be modeled but not detailed. The models should be “simplified” models showing only enough detail to make the part recognizable in the assembly drawings.
- If you want to add a person to your model, there is a “human” that you can manipulate as a subassembly.

Groups:
- Groups will consist of three students from the same section. Groups of a different size have to be approved in advance by the instructor. A group of one will only be permitted if a person is expelled from a group as outlined below. Otherwise, don’t even ask. Choose your team members wisely.
- As a group, decide what project to model. The idea MUST be approved by your instructor, before anyone starts modeling.
- Select a team leader. This person must have the ability, or be willing to learn, to take charge, assign tasks, push when needed, deal with conflicts, etc. The Team Leader is to create a group in Angel.
- You have the right to vote a team member out of your group if the following requirements are met:
  - Your project Gantt chart clearly shows the work assigned to team member.
  - Documentation (your project written memos) clearly shows that the team member has not been satisfactorily completing his or her share of the work.
  - The team member and instructor have been notified in writing that his or her performance must improve or he or she will be voted off the team.
- Students expelled from a team are required to complete all the requirements for their own project in whatever time period is remaining at the time of the expulsion.
Grading:
- The final project constitutes 20% of your course grade.
- The project grade will be determined as follows:
  - Project Log: 20%
  - Presentation and Evaluations (individual, team and self evaluations): 20%
  - Instructor graded working drawings: 60%

Project Log:
One three-ring notebook per team designated for this project only. Include a cover page with a fictitious company name, list of employees (team members’ names), instructor's name, course and section number, and date. Also include tabs with appropriate labels. Project Log MUST be kept current at all times – and brought to class every Monday.

Project Log must include the following:
- An approved project proposal with an exploded isometric sketch of chosen object,
- Original Gantt chart and all updates made during the course of the project,
- Progress report memos,
- Weekly time sheets for each team member,
- Set of working drawings for your product. Due last class of the semester immediately following your presentation. These working drawings should be “perfect” as members of the group should critique (check) each other’s drawings,
- Instructional handout,
- A copy of the final presentation,
- Group evaluation of the project, and
- Any other information gathered which pertains to your project.

Gantt chart:
- Each group must prepare a Gantt chart as a tool to organize the time spent on the project. (Examples in Angel)
- The Gantt chart must include:
  - The name of your company.
  - The name of your product.
  - The date of last revision.
  - List actions to be completed. I.e., create a Gantt chart, estimate the number of hours to measure each part, estimate the number of hours to model each part, etc.
  - Assign one or more team members’ name(s) to each action item.
  - Quote (estimate) the number of hours needed to complete each listed action item.
  - The time period during which the action item(s) are to be completed. (starting and ending dates)
  - Percent of each action item is completed.
- Update your Gantt chart as necessary throughout the course of the project. On Angel, post your team’s current Gantt chart by 11:00 on specified due dates. Print a copy of your Gantt chart changes to place in your Project Log and submit a hardcopy to your instructor.
- Your instructor will be checking to see how well your
  - Gantt chart was laid out and organized, and
  - Your group followed the established Gantt chart (new and revised).

Progress Report Memo:
- The purpose of the memo is to report the status of the project, as well as the contributions that each team member has made since the last required memo. The memos also indicate a plan for what each team member is to accomplish during the next phase of the project.
- A standard Interoffice memo format must be used.
- Include an introduction to remind the reader which project you are working on.
- Use the bullet format stating accomplishments and problem areas.
- Memos should have a conclusion which includes a plan for what will be worked on during the next week.
- Memos are to be one page long and typed on your company’s letterhead. Each group is to e-mail one memo per due. Print and file a copy in your Project Log.
- The quality of the memos, not how much work you accomplished during the week, will be evaluated.
- If you do not have strong writing skills, use the Learning Resource Center to check your grammar, punctuation, etc. (Located outside the Engineering Office)
Time sheets:
- Prepare time sheets in one Excel file.
- Each team member should have their own worksheet to keep track of the time spent on each portion of the project. It should be filled in at the end of EACH WORK SESSION.
- The first worksheet should be a Summary page, listing each team member’s total for the week, the group’s total for the week, and group’s total for the semester.
- Record time by category in 15 minute increments. The categories may include: Modeling, Drafting, Scheduling, Report Writing, Presentation Development, etc.

Instructional Handout:
- Each team is to prepare an instructional handout which will be distributed to the class just prior to the final project presentation. The handout will describe the new topic that your team had to learn to complete your project, i.e., function/feature, animation, etc.
- The handout should contain enough information and instruction to enable your classmates to perform the modeling/drawing task and/or understand the graphics concept fully.
- The handout should fit on one page.

Presentation:
- Each team will prepare and deliver a 6-minute presentation of their project during the last class of the semester.
- Each presentation will be evaluated by the students in the class as well as by the instructor.
- Presentation methodology and content:
  - Use PowerPoint to prepare your presentation.
  - Remember that if there are “technical problems” your entire presentation is relying on computer projection technology, you will have nothing to present. Be prepared with transparencies and/or handouts.
  - Include an Introduction of what you modeled.
  - Show any prototypes.
  - Briefly discuss the information in your Gantt chart.
  - Briefly discuss any modeling methodology (top-down, bottom-up, relations used etc.)
  - Include the “topic” of your instructional handout.
  - Discuss any “Interesting” problems or difficulties that you encountered with this project.
  - Tell us what you learned from this project.
  - Summary

Evaluations:
Written team evaluation:
- An evaluation of your team written by the team.
- Due with your team’s drawings.
- As a team, determine what grade you feel your team deserves for this project. Justify this grade by listing the strengths and weaknesses of your project and report, not the number of hours you spent working on it.
- Did your team do a good job of preparing your Gantt chart?
- How well did your team follow the Gantt chart?
- How quickly did your team realize the Gantt chart needed adjusted and do so?
- If you, as a team, had the project to do over again, what would you, as a group, do differently?

Written self evaluation:
- This is to be turned in separate from the report.
- What grade do you feel you deserve for the report? Justify this grade by listing the strengths and weaknesses of your project and report, not the number of hours you spent working on it.
- If you had the project to do over again, what would you do differently?
- What did you learn about completing a set of working drawings?
- What did you learn from using a Gantt chart?
- What was the biggest thing you learned in this project?

Team work evaluation:
- You will be given a form Presentation Day to fill out.
Other team presentations:
- You MUST be present to evaluate all of the other presentations made by your classmates during the final class period. Evaluation forms will be passed out during the final class period. [Sample of evaluation form.]

Warnings:

You will receive a full letter grade deduction:
- If you are NOT ON TIME to class with completed set of working drawings, evaluations, etc.
- If any portion of the written material is not typed.
- If your team's oral report is not within the plus or minus one minute safety zone. In other words, your oral report must be completed within 5 to 7 minutes.
- Spelling errors in written material or oral presentation slides.
- If you do NOT seriously evaluate other teams presentations.
- Group size other than 3 and not pre-approved.

You will receive an F for the project:
- Project not pre-approved by your instructor.
- If you do not do an oral presentation during your scheduled time.
- If you do not participate in the oral presentation.
- Failure to have the following information approved by instructor BEFORE you start modeling: modeling strategy, tolerances, decimal places, specifications for bolts, nuts, springs, cams, gears, etc.
- If your team does not turn in a complete set of working drawings - PROVIDING sufficient work has been done, but not finished (otherwise an F for the course.)

You will receive an F for the course:
- If you do not show during your scheduled oral presentation time.
- If you do not participate in the oral presentation during your scheduled presentation time.
- If insufficient work has been turned in.
- If any portion of the project is plagiarized.
- If your team does not turn in a completed set of working drawings.
- I the work done for the project was not entirely completed by your group. It is expected that the work done for this project is completely your own!!!

Submission Requirements:
- All items submitted must include names of the company and the team members, i.e., isometric sketch, Gantt chart, etc., must include company name and team members' names.
- The following information must be typed, submitted and approved by instructor BEFORE you start modeling: modeling strategy, tolerances, decimal places, specifications for bolts, nuts, springs, cams, gears, etc. Resources: Machinist Handbook, textbook, McMaster and Carr, Thomas Register, manufacturer for your product, etc.
- For all assignments one hard copy must be filed in Project Log and one posted in Angel at the same time.
- If information submitted needs corrected, you have one week to do so.

Deadlines: (See next page)
## Deadlines:

<table>
<thead>
<tr>
<th>Date and Time Due</th>
<th>What’s Due</th>
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<tr>
<td>Friday, 1/30 by 4:00 pm</td>
<td>▪ Exploded isometric sketch of your idea.</td>
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<tr>
<td>Tuesday, 2/3 by 11:00 am</td>
<td>▪ Teams must be set up.</td>
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<td>▪ Time sheet designed.</td>
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<td>Tuesday, 2/10 by 11:00 am</td>
<td>▪ Current Gantt chart e-mailed.</td>
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<td>▪ Time sheet updated weekly</td>
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<td>Tuesday, 2/17 by 11:00 am</td>
<td>▪ Progress report (memo) e-mailed.</td>
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<td>▪ Turn in modeling strategy for each non-standard part.</td>
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<td>Tuesday, 2/24 by 11:00 am</td>
<td>▪ Progress report (memo) e-mailed.</td>
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<td>▪ List material each part is made from.</td>
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<td>▪ Turn in sketches with dimensions.</td>
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<td>▪ Update Gantt chart</td>
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<td>Tuesday, 3/2 by 11:00 am</td>
<td>▪ Progress report (memo) e-mailed.</td>
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<td>▪ List specifications for standard parts, i.e., fasteners, springs, gears, etc., in proper format in memo.</td>
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<td>▪ Turn in printouts for standard specs. (I.e., printout of catalogue page)</td>
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<td>▪ Updated Gantt chart</td>
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<td>Tuesday, 4/6 by 11:00 am:</td>
<td>▪ Progress report (memo) e-mailed.</td>
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<td>▪ Attach teaching handout for topic.</td>
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<td>▪ Updated Gantt chart</td>
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<td>Tuesday, 4/20 by 11:00 am</td>
<td>▪ Progress report (memo) e-mailed.</td>
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<td>▪ Updated Gantt chart</td>
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<td>Friday, 4/29 scheduled class time</td>
<td>▪ Final Presentation Day</td>
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<td>▪ Self evaluation</td>
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<td>▪ Teaching Handout (1 copy for each classmate)</td>
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<td>▪ Printout of PowerPoint presentation</td>
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