

Introduction to Engineering Design with Professional Development I (ENGR 2050)
Classroom Lab Activity

Activity 02-1	Creating a Gantt Chart
Textbook Reference:	Ulrich & Eppinger – Managing Projects
Purpose / Goal:	Understand the creation and usage of Gantt charts for project planning and tracking (applies to mini project and team project)
Materials / Resources Required:	Paper, pencil, Laptop, Excel based Gantt Chart tool (from LMS)
Time Allocated:	30 minutes

Background

The Gantt Charting tool in Excel was discovered on-line at (<http://www.vertex42.com/ExcelTemplates/excel-gantt-chart.html>). Modifications and enhancements were then made to this tool in an effort to better tailor its use to student projects. This enhanced version of the tool has been posted to the Technical Writing Resources folder on LMS.

Activity

Many people find it easier to “sketch” their project plan on paper before entering it into a formal tool. This activity is written in that manner. Instructors may elect to allow their students to go straight to the Excel tool.

1. On paper, define and write out all of the activities required to design and build your mini-project or team project.
2. Evaluate each activity description to ensure that it is results oriented. Consider each activity to be the work required to achieve a goal. Well defined goals are often “SMART”, as in:

S pecific	M easurable	A ttainable	R ealistic	T ime constrained
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3. For each activity, consider whether they depend on the completion of any of the other activities. An important element of project planning is to understand and plan for these dependencies.
4. For each activity, determine who will be the owner. Well managed projects have a single clearly identified owner for each task. Others may work on the task or be assigned to it but there should be a single owner.
5. Determine when each activity should start. Use your understanding of the task dependencies to alter the start dates accordingly.
6. Determine how long each activity will take and enter in the appropriate end date.
7. Once you have thought through the planning of your project you can enter the information into Excel to create a Gantt chart using the instructions below.

Creating Your Initial Gantt Chart

Copy/download and open the file. You can now enter your project’s data.

- In cell A1 you can replace “Project Name” with the actual name of your project.
- Below that title, you can enter the individual tasks as defined for you project.

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- For each task, enter the name or initials of the owner of that task. It’s important to know who “owns” and is thus responsible for each task.
- From your paper draft project plan, enter the expected start and end dates for each task.
- If your project has already started then you will have some tasks already started and possibly some already completed. You can enter an estimated percentage in the Status column for those tasks. For the projects that might best use this simple tool, its recommended that you limit your inputs here to: 0% for tasks not started, 50% for tasks in process and 100% for completed tasks. The effort is often high while the accuracy is usually low for any other estimated status values. Keep it simple!

Based on the information you have entered so far, the spreadsheet will automatically “color in” the Gantt chart’s bars and will automatically adjust the dates above the bars. It will also automatically color code tasks as either not started, in process or complete.

A sample Gantt chart might look like Figure 1. Note that in this sample, the project ends in early December although the chart continues for a longer period of time. The additional space was used to provide room to add comments to some of the tasks.

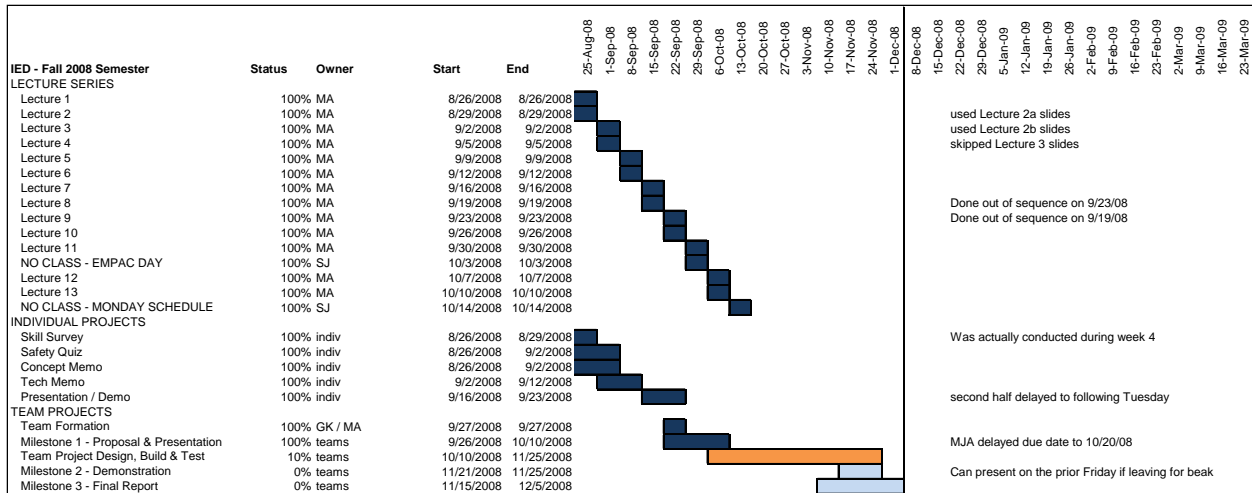


Figure 1 – Sample Gantt Chart

Maintaining Your Gantt Chart

Once the project’s Gantt chart has been created using the tool there are several features that help manage the project.

- **Status updates.** By changing the percent complete in the status column, the Gantt chart will automatically update the color of the bars. This gives a fast color representation of the project’s status.

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- **Date changes.** Once the project can be fully “seen”, problems with resource allocation can become more evident (too many things have to happen at the same time). When this happens, project dates may need to be adjusted. Simply change the Start or End date for a task and the tool will automatically update the chart.
- **New tasks.** Once a Gantt chart is created, additional tasks may be identified. Simply insert a row in the spreadsheet and fill in the data for that task.
- **Getting organized.** After all of the tasks have been listed it may be helpful to organize the chart. As the sample shows, you can insert rows in the chart that serve as headers for the tasks in that section. Our sample chart includes “LECTURE SERIES”, “INDIVIDUAL PROJECTS”, and “TEAM PROJECTS” as headers.
- **Finding your own assignments.** The tool has been set up to take advantage of Excel’s filtering capabilities. The Task Name, Status, Owner, Start and End columns all have filtering turned on. You can filter the Owner column for just your name or initials to see only your tasks. As a project manager you can filter to see the task assignments for any one or even for multiple people on the team.
- **Finding late tasks.** You can filter the End date columns to find tasks that should have been completed by now. Simply filter the End date and use the special date filters to look for end dates that are “before” today. Then use the filter on the Status column to filter out any task already complete. The tasks you see are considered late!
- **Finding tasks that should have been started by now.** Repeating the date filtering on the Start date column looking for any dates “before” today will identify all the tasks that should have started by now. Adding a filter to the Status column to select only those with a Status of 0% will show you the tasks that have not yet begun.
- **Changing the date scale.** On the Setup tab of the workbook you can change the date scale from 7 days per column, as used for the example in Figure 1 to a value of 1 day per column. A scale of 7 days per column makes it easier to see a summary chart. A scale of 1 day per column makes it easier to actually manage the day to day activities for a single semester project.
- **Adding more tasks than are provided in the sample Gantt Chart file.** The tool is provided with a number of tasks hoped to be adequate to manage a small multi-student project. You may add more lines by simply inserting as many as needed somewhere in the MIDDLE of the provided spreadsheet. This is important to retain the automatic features of the tool as provided. The creation of the bars and their color coding is accomplished by conditional formatting. By inserting rows into the middle, Excel will automatically apply that formatting to the new rows. If you add rows AFTER the existing ones, you will have to use the format painter to extend the conditional formatting or manually edit all of the conditional formatting statements to ensure that they include your added rows.

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- **Extending the date range of the Gantt Chart.** The provided tool was set up to permit a scale of 1 day per column and still extend over a complete 16 week semester. If you need more columns, simply insert more in the MIDDLE of the existing ones. This is for the same reasons as those explained in the previous section on adding rows. Adding columns in the middle of the existing ones will allow Excel to take care of the conditional formatting for you.

Using Your Gantt Chart to Manage The Project

Creating a Gantt chart is not a one-time activity! To be useful, it must be maintained. Thus at each class session or team meeting, the group should review their chart and make updates as appropriate.

Reviewing a Gantt chart

1. Does each entry have a deliverable or measurable outcome?
 - a. How do you know when each task is complete?
2. Is every entry's duration no longer than one week
 - a. Break into multiple sub tasks with unique deliverables / measurable outcome
3. Does every item have a single owner (others may help, but good project management dictates a single responsible person).
4. Is the chart current?
 - a. Draw line representing "today".
 - b. Is everything to the "left of today" already complete or in process?
 - i. If not already complete then it's behind schedule.
 1. What is the plan to correct this?
 - ii. If in process, is it as far along as expected?
5. Is everyone busy?
 - a. If they are waiting for another task to complete (e.g. materials to be delivered or fabricated) is there something else they can be working on?
 - b. If they have nothing to work on
 - i. Can they assist a team mate?
 - ii. Have they told their team of their availability?
 - iii. Otherwise - something's probably wrong!
6. Is anyone overloaded?
 - a. Ask team mates for assistance now, **before** something becomes late!

Now – **update your chart as needed!** Be sure to keep it in a location where your entire team can see it, such as on LMS or Google docs. Be sure to include this in your technical report.