

# ME349

## Engineering Design Projects

### Creating a Gantt Chart

#### Project Planning Basics

A **Project** is a set of activities which ends with specific accomplishment and which has (1) Routine and non-routine tasks, (2) Distinct start/finish dates, and (3) Resource constraints (time/money/people/equipment).

**Tasks** are activities that must be completed in order to achieve the project goal. Tasks have start and end points, are short relative to the project and are significant. Use verb-noun form for naming tasks (not "going to library", but rather, "search literature"), other examples would include "create drawings" or "build prototype". Use action verbs such as "create", "define" and "gather" rather than "will be made". Each task has a duration or time to completion. You may find it difficult to accurately estimate the duration of tasks. Doubling your best guess usually works well.

**Milestones** are important checkpoints or interim goals for a project. Can be used to catch scheduling problems early. Name by the same no un-verb form as tasks, e.g. "report due", "parts ordered", and "prototype complete".

Your design will evolve over time so be flexible and update your project plan on a regular basis. It also helps to identify risk areas for project, for example, those things you don't currently have knowledge of, but will have to learn. These are risky because you may not have a good sense for how long the task will take. Another gray area is the response time from vendors. You may not know how long it will take to receive components or information from them.

On a piece of paper, make a list of your project tasks and assign each task tentative start and stop dates (or durations) along with the names of those responsible for the task. Also list any important milestones and their dates. If you have more than 15 or 20 tasks, divide the project into main tasks and sub-tasks. Finally use your lists to create an overall Gantt chart for the main tasks and separate Gantt charts for the sub-tasks that make up each main task.

#### Gantt Chart Basics

Gantt charts are project-planning tools that are used to represent the timing of tasks required to complete a project. Gantt charts are simple to understand and easy to construct. Because of this project managers use them to document all but the most complex of projects.

Within the Gantt chart, each task takes up one row. Dates run along the top in increments of days, weeks or months, depending upon the total length of the project. The expected time for each task is represented by a horizontal bar whose left end marks the anticipated beginning of the task and whose right end marks the expected completion date. Tasks may run sequentially, in parallel or may overlap.

As the project progresses, the chart is updated by filling in the bars to a length proportional to the fraction of work that has been accomplished on the particular task. This way, one can get a quick reading of project progress by drawing a vertical line through the chart at the current date. Completed tasks lie to the left of the line and are completely filled in. Current tasks cross the line and are behind schedule if their filled-in section is to the left of the line and ahead of schedule if the filled-in section stops to the right of the line. Future tasks lie completely to the right of the line.

In constructing a Gantt chart, keep the tasks to a manageable number (no more than 15 or 20) so that the chart fits on a single page. More complex projects may require subordinate charts which detail the timing of the subtasks that comprise a primary task. For team projects, it is advisable to have an additional column containing initials which identify who is responsible for the task.

Often the project has important events that you would like to appear on the project timeline, but which are not tasks. For example, you may wish to highlight when a prototype is complete or the date of a design review. You enter these on a Gantt chart as "milestone" events and mark them with a special symbol, often an upside-down triangle.