**University of Pittsburgh at Johnstown**

**Department of Electrical and Computer Engineering**

# COE/EE 1195

# Engineering Practice (Design) and Professional Development

# "Project Proposal" Course

# PRIMER: Step 4: Time Schedule - Task Division

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**Background**

It's crucial for project managers (i.e. STUDENTS) to break down the tasks to make sure that the project is finished by the deadline (end of COE/EE 1199 semester (typically graduation)). This document provides the necessary background information to complete "Time Schedule – Task Division" submission. Prior to writing this document, students should have a generally agreed upon Engineering Specifications, Design Targets, and components to their design. The components and flow of energy were conveyed with the preceding "Block Diagram" submission. Now, with an understanding of the project's physical components, interconnection relationships, designs (and sub-designs), software (coding), estimated completion times, and time requirements, students prepare a "TIME SCHEDULE – TASK DIVISION".

**Grade Value**

The TIME SCHEDULE – TASK DIVISION comprises 5% of the EE/COE 1195 grade.

**Guidance:**

This document shows how the work involved is partitioned. It features industry standard techniques and tools to define and analyze tasks, objectives, and times. Companies worldwide, large and small, use these project management techniques. Students will present these sections during future oral presentations, and provide to their Advisor during the initial project meetings, and updates throughout the project lifespan.

**Required Sections:**

***1. Introduction:***

A brief overview of the project, and this document. Description of each section may be included here, or at the start of each section.

2***. Work Breakdown Structure (WBS):***

A WBS chart is a hierarchical breakdown of a project into successive levels. Each level contains more detail. It breaks down the tasks into component parts and tasks. Level of detail important: The more detailed, the better. The WBS lacks any time component. This may be outline or block construction format.

***3. Time Scheduling Worksheet:***

In PERT (Program Evaluation and Review Technique) analysis, there are three estimate points. They include *optimistic*, *pessimistic*, and *realistic* estimates. Consider *Optimistic* time as the time that it is unlikely the task can take a shorter period. *Pessimistic* means that it is unlikely that a task can take a longer period. The *Realistic* time analysis shows actual expectations for a task. The Time Scheduling Worksheet must be Table Format. Additional guidance and supporting equations are provided as Figure 1: Time Scheduling Worksheet Guidance.

$$AT = \frac{(a + 4m + b)}{6}$$

$$\sigma^2 = \left(\frac{(b - a)}{6}\right)^2$$

Notes:

- $a$ is the *optimistic* estimate
- $b$ is the *pessimistic* estimate
- $m$ is an estimate of the *mode*
  - i.e., *Realistic / Expected* time
- $AT$ is a calculation of the *mean:*
  - i.e., calculated estimate of *Actual Time*
- $\sigma^2$ is the *variance*; a representation of the *uncertainty*

Figure 1: Time Scheduling Worksheet Guidance

***4. Network Diagram:*** *(showing Critical Path)*

The *WBS* and *Time Scheduling Worksheet* provided the *tasks* and *times*. The Network Diagram combines these elements, and features the Critical Path Method (CPM) (considered a modified PERT chart). Use Activity on Node representation. Identify the specific activities and milestones.

General Planning Steps required:

1. Determine the proper sequence of the activities.
2. Construct a network diagram.
3. Estimate the time required for each activity (us the "*Actual Time*" (aka "*AT*") calculated in the Time Scheduling Worksheet.
4. Determine the *critical path* (longest path through the network).
5. Update the PERT or CPM chart (Network Diagram) as the project progresses.

PERT stands for Program Evaluation and Review Technique. The numbered circles represent tasks or milestones in a project. The arrows show the sequence of these tasks. The time to do a task is shown near the arrow. The critical path in the chart at the left is drawn with BOLD and/or DASHED arrows. PERT charts display task dependencies, showing which tasks need to be done before others can be started. PERT charts also provide the Critical Path of your project.

***5. Task Division:***

Table format. Indicate a reasonable completion date for each item. Additionally, your division of labor among the group members will be indicated. This is the precursor to your GANTT Chart. Time should start at the approximate date of the project TIME SCHEDULE – TASK DIVISION submission.

***6. GANTT Chart:*** *(showing Critical Path)*

You must create a GANTT chart to graphically display your time schedule – task division. Showing the division of labor is optional. Carefully construct this GANTT Chart. *It will be used to communicate your weekly progress to your Advisor*. The horizontal axis of your GANTT chart must display "real" time (e.g., Feb. 13) not "generic" time (e.g., week 3). Your *Critical Path* should be evident.

***7. Conclusion.***

## GANTT Chart Resources (MS Project is on the Pitt Network)

Check out these videos, many available. Don't forget to set YOUR schedule (working hours, including weekends?) A/N, first. Recommend setting up a simple Project first ... good practice. Check out how to show your WBS. You may want to enter " hrs " (versus "days").

Excellent "How-to": https://support.microsoft.com/en-us/office/set-the-general-working-days-and-times-for-a-project-c4587751-2b88-449d-87e5-d3312d16771d

Watch 0-11:30:

https://www.youtube.com/watch?v=PxirUj9FQOg

Nice "Critical Path" vid:

https://www.youtube.com/watch?v=n-Mw3l42sgw

Use a wizard to create a Gantt Chart

https://support.office.com/en-us/article/use-a-wizard-to-create-a-gantt-chart-90ddd935-b0ab-412c-aebc-874f309f6b26

Show the critical path of your project:

https://support.office.com/en-us/article/show-the-critical-path-of-your-project-ad6e3b08-7748-4231-afc4-a2046207fd86

Additional Resources: How to Create a Project Timeline Using Microsoft Project:

https://www.smartsheet.com/blog/how-create-project-timeline-using-microsoft-project

How to make a Gantt chart in Excel Microsoft Excel → This Gantt chart Excel step-by-step tutorial will show you how to make professional Gantt charts using Excel and PowerPoint:

https://www.officetimeline.com/make-gantt-chart/excel