

Tuskegee University
Robert R. Taylor School of Architecture and Construction Science

CSMT 401
Advanced Construction I - Project Planning and Scheduling
Fall 2013

Course Description: The objective of this course is to provide students with understanding the importance of scheduling and planning to the successful completion of a project. Students learn the relationship between the work breakdown structure (WBS), organization breakdown structure (OBS) and activities used in developing project schedules. The Critical Path Method (CPM), Precedence Diagram Method (PDM) and Line of Balance methods (LOB) are discussed in detail to include hand calculations and computer software products. The use of scheduling techniques for project control, resources constraint management, cash flow management and project completion date management are investigated and the importance of communications in the planning and controlling process emphasized. (Prerequisite: CSMT 0331, 0332 and 0344) 3 hours

Broad Course Objectives: After completing this course students should be able to:

- Understand the basic concepts of efficient project planning and cost estimating and scheduling.
- Understand the role of project scheduling in the overall process (in other words, fit complete systems involving general, electrical and mechanical units together in proper sequence.
- Develop a work breakdown structure (WBS) and properly plan and organize project information in order to develop a schedule.
- Define what an activity is, determine the activities in a project, estimate and develop durations for activities from various resources and determine their relationship to each other.
- Develop a bar chart for a construction project.
- Manually create and calculate a schedule using network scheduling technique for a construction project using CPM schedule.
- Perform Critical Path Method computations using “activity on arrow” and “activity on node” methods manually and with computers.
- Perform Precedence Diagramming Method computations with leads and lags.
- Explain and perform resource allocation and resource leveling
- Perform Linear Line of Balance Scheduling.
- Perform activity time and float computations manually

Time: Tuesday and Thursday evenings: 6:00p.m. – 7:30p.m. **Location:** Wilcox E

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Office Hours: By appointment

- Texts:**
1. **Construction Project Scheduling and Control – Second Edition** by Saleh Mubarak
ISBN: 978—0-470-50533-5
 2. **Real World Construction Scheduling** by Jim Coombes
ISBN: 0-9626648-0-4 Hardcover ISBN: 0-9626648-1-2 Softcover
 3. (Supplemental Handouts)

Assignments: Assignments include *in-class work and homework assignments*. There will be a number of in-class work sessions during the semester. For the in-class work sessions, credit will be given if you: 1.) complete the required work, 2.) sign the worksheet, and 3.) turn in the worksheet immediately after class. There will be no credit given for : 1.) missed in-class work sessions, or 2.) worksheets that are handed in late. When calculating your grade for the in-class work sessions, you may drop your lowest grade.

All homework assignments turned in for grading must be on engineering paper or typed paper, unless otherwise specified by the instructor. All assignments are due at the indicated time, on the date specified. No late assignments will be accepted for grading unless an extension is granted. Students are responsible for adapting to changes in the schedule. Missed assignments made be made up only when permission has been granted **before** due date. Quizzes and other in-class activities **cannot** be made up. **Assignments will be turned in electronically.**

Exams: A mid-term and a comprehensive Final Exam shall be given. The Exam will include material from all reading assignments and class discussions. No make-up exams are given unless arranged *prior* to the scheduled exam. **The instructor's discretion** will be used to determine whether a student should be given a make-up exam and/or assignment. Consideration will be given in cases of illness or emergency.

Final Project: The class will conclude with a Final Scheduling project, of which the previously completed homework assignments will be building towards. Students are expected to incorporate feedback from the instructor on the homework assignments into their Final Project. Please take note that the Final Project is weighted higher than the Final Exam

Blackboard Vista (BV) Communications: Reading assignments, lectures, and homework assignments with due dates will all be communicated on the Course Blackboard Home Page. Students are responsible to check the Course Blackboard Home Page on a regular basis for announcements and assignments.

Class Attendance, Preparation and Participation: There will be formal lectures each class. Attendance is mandatory. Students are expected to participate actively in class exercises. Attendance, quizzes, and in=class work/assignments/practice are all parts of the course grade. Completion of class reading assignments is required to build proficiency and meet course learning objectives. Reading assignments are to be completed prior to the start of class.

Grading Scale: A - 90%-100% B - 80%-89% C - 70%-79% D - 60%-69% F – Less than 60%

<u>Component</u>	<u>% of Grade</u>
Homework	20%
Mid-Term Exam	20%
Final Exam	25%
Final Project	35%
Total	100%

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<i>Week</i>	<i>Date</i>	<i>Topic</i>	<i>Basic Text</i>	<i>Assignments</i>
1	Week of August 19 th	Intro to Planning and Control Bar (Gantt) Charts	Mubarak Ch. 1, 2,	
2	Week of August 26 th	Basic Networks	Mubarak Ch. 3	Assignment 1 Due
3	Week of September 2 nd	The Critical Path Method (CPM) Precedence Networks	Mubarak Ch. 4, 5	
4	Week of September 9 th	Precedence Networks	Mubarak Ch. 5	Assignment 2 Due
5	Week of September 16 th	Resource Allocation and Resource Leveling	Mubarak Ch. 6	
6	Week of September 23 rd	Schedule Updating and Project Control	Mubarak Ch. 7	Assignment 3 Due
7	Week of September 30 th	Schedule Compression and Time-Cost Trade-Off	Mubarak Ch. 8	
8	Week of October 7 th	Reports and Presentations	Mubarak Ch. 9	
9	Week of October 14 th	Mid-Term Review Mid-Term Exam	Chapters 1 – 8	
10	Weeks of October 28 th	Scheduling as Part of the Project Management Effort Other Scheduling Methods	Mubarak Ch. 10, 11	Assignment 4 Due
11	Week of November 4 th	Dynamic Minimum Lag Relationship	Mubarak Ch. 12	Assignment 5 Due
12	Week of November 11 th	Construction Delay and Other Claims	Mubarak Ch. 13	
13	Week of November 18 th	Schedule Risk Management	Mubarak Ch. 14	
14	Week of November 25 th	Thanksgiving Recess begins on Tues 26 th after last class		
15	Week of December 2 nd	Final Project Due Final Exam Review		
16	Week of December 9 th	Final Exam	Comprehensive	