
BCN 5722 Advanced Planning and Control
Course Outline and Policies
ME Rinker Sr School of Building Construction
University of Florida

INSTRUCTOR:

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OFFICE HOURS:

[See my timetable](#) ; and by appointment

CLASSES:

[See my timetable](#) for time and location of classes.

PREREQUISITES:

None.

SUBJECT:

The understanding and solution of complex planning, monitoring, and control problems arising in construction, using advanced planning tools.

OBJECTIVES:

To learn the use and application of advanced tools to the planning, monitoring, and control of residential, commercial, industrial, and heavy construction projects.

Students taking this course will already have a comprehensive understanding of the fundamentals of planning, monitoring and controlling a construction project using CPM (Critical Path Method) and its related techniques. This course builds upon this basic knowledge, developing expertise in dealing with problems such as uncertainty in the performance of resources, modeling repetitive construction work, and simulating construction processes.

The course will provide students with the understanding of the tools and methods necessary to be leading construction managers in the new century.

WEB USAGE:

A policy of this course is to utilize the web as far as possible for posting of materials. Materials for this course can be accessed by going to the following address: <http://128.227.160.197/flood/index.html> . **Bookmark this address.** Once you are at this address, just select the Advanced Planning and Control course, and the information you are seeking will be listed.

This semester, all assignments issued by Dr Flood will be posted on the above web site as they become available.

COURSE PACKAGE AND MATERIALS:

Each section of the course (listed under Topics below) has a PowerPoint presentation. These PowerPoint presentations are made available to students at this website. You should go to the website and printout all PowerPoint presentations as slides, and bring them along to class. A package comprising supplementary notes and journal articles is made available at the start of the semester.

I suggest you obtain and work through the corresponding set of 8 tutorials which demonstrate the basics of using P3e/c (Primavera Project Planner), and the corresponding set of PowerPoint presentations from my BCN 4720 course materials - the tutorials and PowerPoint presentations for this course are freely available to BCN 5722 students at the [BCN 4720 section of Dr Flood's Intranet Web site](#).

REFERENCES:

There is no single text that covers all aspects of this course. Therefore there is no specific text recommended for purchase. Instead, during the semester, you will be provided with handouts and assigned specific readings that you can access from the library. The following books are suggested for general reference:

- Bennett, John, International Construction Project Management, Butterworth Heinemann, London, 1991.
 - Construction Project Scheduling, by Callahan, Quackenbush and Rowings, published by McGraw Hill, 1992.
 - Construction Planning and Scheduling, by Associated General Contractors of America, 1994.
 - Construction Project Management, 3rd Edition, by Clough and Sears, published by John Wiley and Sons Inc, 1991.
 - Design of Construction and Process Operations, by Halpin and Woodhead, published by John Wiley and Sons, 1976.
 - Caterpillar Performance Handbook, by Caterpillar Inc, Peoria Illinois, latest edition (1992 = 23rd edition).
 - Getting to Know P3, by Primavera Systems Inc.
 - Means Construction Cost Data, by R S Means and Co Inc.
 - Walker's Building Estimator's Reference Book, by F R Walker Co.
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GRADING:

ITEM	Grade
Exam 1	10%
Exam 2	10%
Review Assignment	10%
Term Project	20%
Tutorial 4	10%
Tutorial 5	10%
Tutorial 6	10%
Tutorial 7	10%
Tutorial 8	10%
Tutorial 9	<i>no grade (in-class lesson)</i>

TOTAL

100%

A \geq 93.3; A- \geq 90.0; B+ \geq 86.7; B \geq 83.3; B- \geq 80.0; C+ \geq 76.7; C \geq 73.3; C- \geq 70.0; D+ \geq 66.7; D \geq 63.3; D- \geq 60.0; E < 60

Homework that is submitted late will usually be penalized at a rate of 10% per day.

Class attendance will be taken on occasions.

GENERAL:

Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

Students must respect all copyright laws.

The university honor code will be enforced.

OTHER REQUIREMENTS:

It is recommended that you purchase a box of diskettes for back-up of your files. **KEEP REGULAR BACKUPS OF ALL YOUR FILES IN CASE OF A SYSTEM FAILURE!!!** It is recommended that you bring your own laptop to class for the computer lab' sessions, however, you may have to use the School's computers to run some software, and in these cases the only way to save your work is to write it to a thumb drive or send it to yourself as an email attachment.

TOPICS:

The following provides an overview of the topics that will be covered and the planned order in which they will occur. This is a tentative schedule, subject to change. Note, class time will be divided approximately equally between: (i) lectures; (ii) class discussions, tutorials, and case studies; and (iii) computer laboratories.

1. INTRODUCTION TO PROJECT PLANNING - Bus Stop Case Study:

Week 1 & 2: What is planning, the stages of planning, and the elements of the construction project management process. Bus Stop case study based review.

2. REVIEW OF DETERMINISTIC CRITICAL PATH METHOD - Primavera Project Planner:

Week 3: CPM-based scheduling using precedence diagrams (including resource management; cost analysis; site implementation of the plan; and project control). Review of basic planning tools including the Primavera Project Planner software: this covers the Critical Path Method and Linked Bar Charts, precedence diagrams, defining project logic within a WBS, ladder constructs for modeling repetitive tasks, resource leveling, cost loading, and monitoring and controlling progress.

3. MODELING UNCERTAINTY IN CONSTRUCTION:

Week 4: Uncertainty in a project schedule, and its significance (the fallacy of averages; the statistical integration technique and its limitations, the enumerative solution and its limitations).

4. PERT:

Week 5: PERT (Program Evaluation and Review Technique) as a means of accounting for uncertainty (the methodology; the information it provides, its advantages and drawbacks).

5. MONTE-CARLO BASED CPM:

Week 6: CPM using Monte Carlo sampling as a means of accounting for uncertainty (the methodology, the information it provides, its advantages and drawbacks). Primavera Project Planner (P3) using Monte Carlo sampling (computer lab).

6. CONSTRUCTION SIMULATION:

Week 7: Construction planning using simulation modeling (simulation modeling theory; the applications; the CYCLONE method).

Week 8 Stochastic construction simulation techniques (the method, the additional information it provides).

Week 9: Application of CYCLONE and Caterpillar simulation software (equipment intensive and labor intensive processes - computer lab).

7. REPETITIVE CONSTRUCTION:

Week 10: Learning and forgetting effects, and their impact on planning repetitive construction.

Week 11: Planning repetitive construction: Linear Scheduling.

8. ADVANCED RESOURCE MANAGEMENT:

Weeks 12 and 13: Advanced resource management in scheduling (managing space and cost as resources, satisfying constraints on these resources using P3).

9. SEQUENCING CONSTRUCTION TASKS:

Week 14: Sequencing Theory (the job-shop problem and its solution, other more complex sequencing problems and solution methods).

Note: an additional week has been reserved for interim exams (dates to be announced) and holiday periods.