

# USC Viterbi

School of Engineering  
*Sonny Astani Department  
of Civil and Environmental  
Engineering*

## **CE 569: Project Controls**

**Units: 4**

**Spring 2023**

**Thursdays, 6 pm to 9:40 pm**

**Location: RTH 105**

**Instructor: Devang Dedhia, PSP**

**Office:** Virtual

**Office Hours:** 30mins after class on class days or by prior appointment

**Contact Info:** dedhia@usc.edu (Please allow 2-3 business days for a response)

**Teaching Assistant: Pooya Adami**

**Office:** TBD

**Office Hours:** TBD

**Contact Info:** TBD

**D2L Help:** D2L Help

**Hours of Service:** 24/7

**Contact Info:**

- <https://viterbigrad.usc.edu/technical-support/>
- Call 213-740-9356
- Send an email to [dentsc@usc.edu](mailto:dentsc@usc.edu)

**Viterbi IT Help:** Viterbi IT Help

**Hours of Service:** Mon-Fri, 8 am – 5 pm

**Contact Info:**

- <https://viterbi.usc.edu/resources/vit/getting-assistance/>
- Call 213-740-0517
- Send email to [engrhelp@usc.edu](mailto:engrhelp@usc.edu)
- Walk-In support is available by visiting DRB 205

**Blackboard Help:** Blackboard Help

**Hours of Service:** 24/7

**Contact Info:**

- <https://studentblackboardhelp.usc.edu/>
  - Call 213-740-5555 and choose option 2
  - Text chat and Blackboard 9 Support Portal
- Send an email to [blackboard@usc.edu](mailto:blackboard@usc.edu)

## Course Description

### Catalog Description

Project controls principles: cost engineering, planning and scheduling concepts, schedule development, project progress monitoring, and how to evaluate variances and changes.

### Expanded Course Description

As long as there is a construction project, there will always be a need to answer the question, “What is the status of the project?” Effective project controls offer a systematic way to develop, monitor, forecast, and control the project cost and schedule. Every team member needs to understand and master project controls as they will be engaged in the solution to manage any project successfully. This course is designed to educate, encourage and inspire future leaders about project controls principles that enable successful project delivery. In this course, students will learn about the various elements of cost and schedule, cost engineering concepts, develop a schedule, evaluate project status, monitor the project progress, and learn how to respond to variances and changes in the project. The course will help students connect various learning concepts from other courses and integrate multiple data points in the project controls process.

## Learning Objectives and Outcomes

- Explain the different concepts and considerations for planning, scheduling, and cost management of projects
- Apply the concepts of project controls
- Develop schedules for projects
- Develop budgets for project
- Forecast the project end date and timing of individual tasks
- Forecast the estimated costs at completion of the project

After taking the course, the student will be

- Able to apply their knowledge of Project Controls on any project
- Able to develop a Project Controls approach to track costs and schedule on any project
- Learn about industry best practices for Project Controls
- Essential software (Oracle’s Professional Project Management Software P6) skills for creation and maintenance of project schedules

Discussions in the classroom will emphasize the theory and understanding of the various concepts and methodologies related to Project Controls. While the course syllabus lists an outline of course material, class discussions and progress will guide coverage of the course material. In the course, students will be introduced to Oracle’s Professional Project Management Software for developing and tracking projects.

Student participation is required in class. Students will read and research topics as part of this course. The course includes time for students to reflect, contemplate, and involves interactive discussion with students and industry professionals. Students can access all the course material, assignments, announcements and discussions through D2L or BlackBoard.

While office hours are limited due to work constraints, all efforts will be made to meet and resolve any questions or issues you may have.

## Technological Proficiency and Hardware/Software Required

Students must have a working knowledge of computer systems, along with Microsoft Word, Excel, PowerPoint, Blackboard and D2L systems.

## Required Readings and Supplementary Materials

The following books will be used in the course. In addition, students will receive extra reading material and supplementary materials during the course.

### Course Bibliography:

1. Applied Cost Engineering Third Edition, by Forrest Clark, A.B. Lorenzoni, ISBN-10: 9780824798000 ISBN-13: 978-0824798000 ASIN: 0824798007
2. Construction Planning and Scheduling Second Edition, by Thomas E. Glavinich, D.E., P.E., The Associated General Contractors of America, 2004, ASIN: B001D06PIM, ISBN-13: 978-0010034158
3. Planning and Control Using Oracle Primavera P6 Versions 8 to 17 PPM Professional, Paul E Harris, Eastwood Harris, 2017, ISBN-10: 1925185508, ISBN-13: 978-1925185508

### Optional Reference Books:

1. AACE Professional Practice Guide PPG #12: Construction Project Controls, Second Edition, Edited by Dr. Douglas D. Gransberg, PE CCE FRICS and Eric Scheepbouwer, AACE International, 2010
2. CPM Scheduling for Construction: Best Practices and Guidelines, PMI, 2014 ISBN13: 978-1-62825-037-4

## Description and Assessment of Assignments

Students will be graded on quizzes, essays, reports, and problems.

Homework Assignments demonstrate the student's understanding of the principle or procedure introduced in the class. Homework Assignments will be graded on demonstration of knowledge, precision, thoroughness, and visual presentation. Each Homework Assignment will have equal weightage towards its category (25% of the Final Letter Grade).

The Mid-Term Exam and Final Exam will consist of multiple-choice questions, written calculations, questions with short answers.

For the Individual Paper, students will conduct an interview with industry professional(s) and submit a well-written report on any of the following topics – project controls initiatives in the company, project controls goals and plan to achieve goals, project controls training, current project control practices or any other project controls related topic with the Professor's approval. The report is not a transcript of the interview(s). If student is currently working in any organization, the interview subject must work outside their organization. Students will submit a three to five-page report. Attachments are not included in the page count.

## Grading Breakdown

Assignment	% of Grade
Participation in class discussions and on the Discussion Board	10
Assignments	25
Individual Paper	15
Mid-Term Exam	25
Final Exam	25
<b>TOTAL</b>	<b>100</b>

## **Grading Scale**

Course Letter grades will be determined using the following scale:

A	95-100
A-	90-94
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
F	59 and below

## **Assignment Submission Policy**

Assignments will be posted on Blackboard/D2L with due dates. Students shall include their full name on each page of the assignments for both hard copies & electronic copies. When submitting electronic files, please include your student name in the filename(s).

For each assignment, the latest attempt will be considered for grading. Students are responsible for submitting complete file(s) in their latest attempt. Any assignment attempts submitted after its original due date will be treated as a Late assignment. Late assignments will be accepted, and a penalty of 15% points per day will be deducted for a late submission. Late assignments will not be accepted after the last class or one week from the original due date, whichever is earlier.

## **Grading Timeline**

Assignments will be graded and returned before the next week's class.

## Course Schedule: A Weekly Breakdown

	Topics/Daily Activities	Reading Topics	Homework Deliverable
Week 1 12-Jan	<ul style="list-style-type: none"> <li>· Project Controls – Introduction, Overview, Purpose and Benefits</li> <li>· Cost Elements – Characteristics, types, considerations.</li> </ul>	<ul style="list-style-type: none"> <li>· Syllabus</li> <li>· Glavinich Chapter 1</li> <li>· Clark-Lorenzoni Chapter 1, 13</li> </ul>	None
Week 2 19-Jan	<ul style="list-style-type: none"> <li>· Scope of Work &amp; Contracts</li> <li>· Budget Development - Work Breakdown Structure, Techniques and considerations</li> </ul>	<ul style="list-style-type: none"> <li>· Clark-Lorenzoni Chapter 9</li> </ul>	Assignment – Cost Elements
Week 3 26-Jan	<ul style="list-style-type: none"> <li>· Capital Cost Tracking – Accuracy, Different Methods and Considerations</li> </ul>	<ul style="list-style-type: none"> <li>· Clark-Lorenzoni Chapter 2, 3, 4</li> </ul>	Assignment – WBS
Week 4 2-Feb	<ul style="list-style-type: none"> <li>· Contingency - considerations and application</li> <li>· Escalation – different methods, considerations and application</li> </ul>	<ul style="list-style-type: none"> <li>· Clark-Lorenzoni Chapter 10, 11</li> </ul>	Assignment – Cost Tracking
Week 5 9-Feb	<ul style="list-style-type: none"> <li>· Planning vs Scheduling - differences, methods Considerations, issues</li> <li>· Types of Schedules - advantages, disadvantages, suitability and usage</li> </ul>	<ul style="list-style-type: none"> <li>· Glavinich Chapter 1</li> <li>· Harris Chapter 1</li> <li>· Glavinich Chapter 4, 5, 7, 17</li> <li>· Harris Chapter 2, 3</li> </ul>	Assignment – Contingency & Escalation
Week 6 16-Feb	<ul style="list-style-type: none"> <li>· CPM Network Mechanics - suitability, usage, drawbacks and considerations</li> </ul>	<ul style="list-style-type: none"> <li>· Glavinich Chapters 5, 7, 17</li> <li>· Harris Chapter 4, 5, 6, 11</li> </ul>	Assignment – Planning & Scheduling
Week 7 23-Feb	<ul style="list-style-type: none"> <li>· Calendar &amp; Constraints - concept and analysis, applications, issues</li> </ul>	<ul style="list-style-type: none"> <li>· Glavinich Chapters 5, 7, 17</li> <li>· Harris Chapter 4, 5, 6, 11</li> </ul>	Assignment – CPM Network
<b>Week 8</b> <b>2-Mar</b>	<ul style="list-style-type: none"> <li>· Activity - concept and analysis, applications, issues</li> <li>· Activity Logic - concept and analysis, applications, issues</li> </ul>	<ul style="list-style-type: none"> <li>· Glavinich Chapter 2, 3</li> <li>· Harris Chapter 7, 9, 22</li> </ul>	Assignment - Calendars

Week 9 9-Mar	<b>MID-TERM EXAM (remote exam)</b>	D2L Quiz Tool	
16-Mar	SPRING RECESS		
Week 10 23-Mar	<ul style="list-style-type: none"> <li>· Schedule Data Mining – filter, sort and schedule organization</li> <li>· Schedule Qualitative Analysis - Reports, Output, considerations</li> </ul>	<ul style="list-style-type: none"> <li>· Glavinich Chapter 8</li> <li>· Harris Chapter 8, 12, 13, 15, 22</li> </ul>	Assignment – Activity development
Week 11 30-Mar	<ul style="list-style-type: none"> <li>· Cost &amp; Schedule Integration - Resource-loading &amp; Cost-Loading concepts and analysis</li> </ul>	<ul style="list-style-type: none"> <li>· Glavinich Chapters 9, 19, 21</li> <li>· Harris Chapter 14, 18, 19, 20</li> </ul>	Assignment – Schedule Data Mining
Week 12 6-Apr	<ul style="list-style-type: none"> <li>· Change Control - sources, analysis and considerations</li> <li>· Evaluating Schedule Impacts</li> </ul>	<ul style="list-style-type: none"> <li>· Clark-Lorenzoni Chapter 20</li> </ul>	Assignment – Cost-loading, Resource-loading and schedule analysis
Week 13 13-Apr	<ul style="list-style-type: none"> <li>· Probabilistic Schedules - methods and considerations</li> <li>· Linear Schedules - methods and considerations</li> </ul>	<ul style="list-style-type: none"> <li>· Glavinich Chapter 16</li> <li>· Glavinich Chapter 18</li> <li>· Clark-Lorenzoni Chapter 27</li> </ul>	No assignment.
Week 14 20-Apr	<b>THANKSGIVING</b>		Individual Paper is due.
Week 15 27-Apr	<ul style="list-style-type: none"> <li>· The Cost &amp; Value of Project Controls</li> </ul>		
Week 16 4-May	<b>FINAL EXAM 7 pm to 9 pm</b>	D2L Quiz Tool	FINAL EXAM Date: For the date and time of the final for this class, consult the USC <i>Schedule of Classes</i> at <a href="http://classes.usc.edu/">classes.usc.edu/</a> .

## Statement on Academic Conduct and Support Systems

### Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” [policy.usc.edu/scampus-part-b](https://policy.usc.edu/scampus-part-b). Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, [policy.usc.edu/scientific-misconduct](https://policy.usc.edu/scientific-misconduct).

### Support Systems:

*Student Health Counseling Services - (213) 740-7711 – 24/7 on call*  
[engemannshc.usc.edu/counseling](https://engemannshc.usc.edu/counseling)

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

*National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call*  
[suicidepreventionlifeline.org](https://suicidepreventionlifeline.org)

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

*Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 – 24/7 on call*  
[engemannshc.usc.edu/rsvp](https://engemannshc.usc.edu/rsvp)

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

*Office of Equity and Diversity (OED) | Title IX - (213) 740-5086*  
[equity.usc.edu](https://equity.usc.edu), [titleix.usc.edu](https://titleix.usc.edu)

Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations.

*Bias Assessment Response and Support - (213) 740-2421*  
[studentaffairs.usc.edu/bias-assessment-response-support](https://studentaffairs.usc.edu/bias-assessment-response-support)

Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation and response.

*The Office of Disability Services and Programs - (213) 740-0776*  
[dsp.usc.edu](https://dsp.usc.edu)

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test-taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

*USC Support and Advocacy - (213) 821-4710*  
[studentaffairs.usc.edu/ssa](https://studentaffairs.usc.edu/ssa)

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

*Diversity at USC - (213) 740-2101*  
[diversity.usc.edu](https://diversity.usc.edu)

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

*USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call*

[dps.usc.edu](https://dps.usc.edu), [emergency.usc.edu](https://emergency.usc.edu)

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

*USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call*

[dps.usc.edu](https://dps.usc.edu)

Non-emergency assistance or information.