



**ISE 495ab: Senior Project Design**

Fall 2018 — Wed - 6:30-10:00 pm

Location: KAP160/KAP 267

<p><b>Coach: James Moore</b>  <b>Office: GER 203.</b>  <b>Office Hours: Wednesday 4:30- 6:00, Thursday 4:00 – 5:30, or by appointment.</b>  <b>Contact Info:</b>  <b>email: <a href="mailto:jmoore@usc.edu">jmoore@usc.edu</a>;</b>  <b>USC: (213) 740-0595;</b>  <b>Cell: (213) 663-8146.</b></p>	<p><b>Coach: Theodore Mayeshiba</b>  <b>Office: GER242A.</b>  <b>Office Hours: By appointment.</b>  <b>BlueJeans (preferred):</b>  <b>Follow link on Blackboard site</b>  <b>Contact Info:</b>  <b>email: <a href="mailto:mayeshib@usc.edu">mayeshib@usc.edu</a>;</b>  <b>USC: (213) 740-0867;</b>  <b>Skype: mayeshiba;</b>  <b>Office: (213) 342-1815.</b></p>
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**Blackboard (Bb) Help: (213) 740-5555 option 2**

**Email: [blackboard@usc.edu](mailto:blackboard@usc.edu)**

**Combined, Detailed Course Description**

This course will prepare students for engineering practice through a major design experience based on the knowledge and skills acquired in earlier course work and incorporating appropriate engineering standards and multiple realistic constraints. The sequence includes:

- Preparation and development of the senior project proposal.
- Identification and definition of appropriate engineering standards.
- Identification of constraints which will help define and bound the project proposal.
- Group work on an industrial engineering design problem in the assigned organization.
- A design of a system, component, or process to meet the desired needs of the client within defined, agreed constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability as examples.

This description includes all elements called out in the *USC Catalogue*, but offers more detail.

**Course Overview**

USC’s first priority is the education of our students. Our goal includes graduating engineers capable of serving the public good, reaffirming their commitment to core academic principles and equipping our graduates to face contemporary global challenges.

This course serves as the experiential capstone in the undergraduate Industrial and Systems Engineering curriculum. You will apply your classroom knowledge to a real project in a real

work setting (e.g., manufacturing floor, healthcare clinical setting, logistics distribution facilities, etc). In the past decade, U.S. manufacturing enterprises such as the automotive and aerospace industries have adopted, implemented and evolved Lean approaches based upon the Toyota Production System, Six Sigma, and other enterprise change models. Aerospace, healthcare and logistics industries have adopted Lean to significantly reduce time and capital cost and to increase customer satisfaction. This is framework and perspective from which students will see how ISE tools can be used to analyze and frame problem statements in real situations (495A) and then complete a project to assist clients to improve performance and quality (495B).

The students in this class will learn to:

- handle difficulties associated with defining and organizing a realistic problem statement;
- manage impediments in obtaining information and approval;
- present and sell ideas to higher-level management;
- convert a project's worth into financial indicators;
- understand the importance of continuous exchange between engineers, management and employees in solving an existing problem, given a set of constraints;
- gain experience in the organization and management of a technical project that includes application of industrial engineering tools and methods, time and cost estimates, communication techniques, and project monitoring and follow-up;
- about the politics of a company and how it impacts a team's progress;
- meet aggressive deadlines in a multidisciplinary team effort;
- improve project-based presentation skills, both in-class and in company settings;
- establish contacts with local industry;
- recognize the need for application of industrial engineering principles and corresponding value to an organization; and
- describe opportunities for applying industrial engineering principles to the client's future work assignments

### **Prerequisites**

- ISE 225, ISE435, ISE 460
- One from DSO 435 or ISE 382
- One from ISE 370 or ISE 470

### **Co-requisite for ISE 495b**

- ISE 495a

### **Recommended Preparation:**

- Review notes from ISE105 or read: *Turner, et al, Introduction to Industrial and Systems Engineering*, 3<sup>rd</sup> Ed., Prentice Hall (1992), ISBN 0-13-481789-3.
- Many projects require a formal statistical analysis as outlined in ISE 225: *Montgomery, Runger, and Hubele, Engineering Statistics*, 5<sup>th</sup> Ed., John Wiley and Sons, New York, NY (2011), ISBN 0-47-063147-3.
- Many projects require an analysis as outlined in ISE460: *Park, Chan S., Contemporary Engineering Economics*, 5th Ed., Prentice Hall, (2011), ISBN 0-13-611848-8.
- Be capable of:

- preparing professional papers and presentations in the English language using proper citation.
- producing documents in MS PowerPoint with embedded audio and/or video which begins automatically upon first click.
- providing project management reports including:
  - WBS
  - Baseline schedule
  - Weekly updates comparing project completion to baseline
- Technological Hardware/Software Proficiency
  - Access to a computer with a web camera, microphone, preferably with a headset with microphone and headphone.
  - Proficiency with the use of
    - BlueJeans;
    - the BlackBoard system (NO work will be accepted by email unless previous arrangements have been made);
    - use multimedia on MS PowerPoint including inclusion of audio files which begin automatically with the beginning of your presentation; and
    - use of MS Project.

**Required Readings, Supplementary Materials, and Course Notes**

This course is Web-Enhanced with high reliance on Blackboard. Readings and supplementary materials will be posted to Blackboard as needed, accompanied by a posting on Announcements. All assignments will be submitted to Blackboard. No assignments will be accepted by email or paper unless arrangements have been made in advance. Copies of lecture slides and other class information will be posted on Blackboard. Supplementary materials and other reference guidance will be posted to Blackboard as well under *Course Documents*.

**Grading Breakdown**

495ab	Weight
Progress Update Reports to client and professors 10 submissions at 1% each	10%
Maintenance of project progress to baseline and WBS update to professors only 8 submissions at 1.25% each	10%
Interim Presentations (5% x 2) Dress Rehearsal (10%)	20%
Written Report	15%

Final Sponsor Evaluation	20%
Homework 10 submissions at 1% each	10%
Instructors Evaluation <ul style="list-style-type: none"> <li>• Peer Evaluations</li> <li>• Interim feedback from sponsor and representatives</li> <li>• Individual contribution for each progress report</li> <li>• Interaction with team members</li> <li>• Discussion section contribution</li> <li>• Attendance</li> </ul>	15%
Total	100%

Punctuality will be considered in the evaluation of performance. This means for meetings of your team, punctual class attendance as well as scheduled meetings with the instructor(s). Absence or extreme tardiness of a chronic nature will be noted and result in a lower Instructors Evaluation grade.

There are no extra credit assignments or makeup assignments for missed or late work. A score of “0” will be assigned.

**Homework Activities Involving Clients\***

These items are to be reviewed and approved by the client.

*Business Case\**

After the initial meeting with the clients, this assignment is intended to offer clarifying feedback between your team and the client. It is important that after you submit and receive feedback on this case, you review this with the client, so clarity is established about the “next steps”. (NOTE: Details of requirements will be reviewed during topic lecture).

*Charter\**

After approval of the business case by the client, you may embark upon obtaining approval of the Charter statement. This should at minimum establish basic expectations of responsibilities (e.g., how often the team will be present, who will be contacted, etc.) (NOTE: Details of requirements will be reviewed during topic lecture).

*Updates\**

Weekly reports to the client (short, an email with professors on cc is appropriate) that cover:

- What the team accomplished last week

- What the team plans on doing next week
  - Any problems that the team is encountering and associated requests for help
- Weekly reports are due at 17:00 on assigned Fridays.

### **Other Homework**

Other homework assignments will have instructions posted to Blackboard.

### **Presentations**

#### *Interim Presentation 1*

The first **Interim** presentation is nominally 5 slides, a maximum 6 minutes, with audio recorded on a PPT file.

- Title slide – persons on the team are listed.
- Context setting slide (background) – Who is the client? What is the client’s problem?
- What measures / data have you collected to confirm the client’s initial statement?
- Considering the collected data, how does the TEAM ***define*** the problem at hand?
- What’s the next step? Your goal is to find the root cause problem.

#### *Interim Presentation 2*

- Title slide – persons on the team are listed.
- Charter, Scope, Cost plan, Schedule plan, Quality plan, Risk plan.
- What’s the next step?

#### *Dress Rehearsal Presentation*

The **Dress Rehearsal** presentation is nominally 6-9 slides, and a maximum of 9 minutes.

1. Title slide – persons on the team are listed.
2. Project charter (revised if necessary).
3. What measures / data have you collected to confirm the client’s initial statement?
4. Considering ALL the collected data, how does the TEAM ***define*** the problem at hand, (likely revised from last presentation)? Data analysis is included.
5. Scope statement and proposed schedule.

**NOTE:** We realize there is probably much more you will want to say at this point, but the purpose of the **Dress Rehearsal** is only to understand and approve the strategy of the **Final Presentation**. We **strongly** suggest that you make available detail information in a separate file, submitted to Blackboard for review if there are any questions. **Do Not** make arrangements for the final presentation with the client until this presentation has been reviewed and approved.

### **Schedule**

The Calendar called out below is **approximate** and **subject to change**. You are working in an uncertain environment. This is a living document, and will be modified as need based on the course requirements.

Week	Date	Topic	HW	Due
1	8/22	Introduction	Selection of Project	8/24
2	8/29	Project Management as a Tool	Business Case (Initial meeting with client)	
3	9/5	Getting Started	Project Charter	Business Case*
4	9/12	Communication	Communication Plan	Charter*
5	9/19	Stakeholders	Stakeholder / RACI Plan	Communication Plan Update
6	9/26	Scope	Presentation	Stakeholder / RACI Plan Update
7	10/3	Scheduling	Proposed Schedule	Interim Presentation 1 Update
8	10/10	Cost	Cost management plan	Proposed Schedule Update
9	10/17	Risk	Risk management plan	Cost management plan Update
10	10/24	Quality	Project quality plan	Risk management plan Update
11	10/31	Critical Chain	Critical chain schedule	Interim Presentation 2 Project quality plan Update
12	11/7	Monitor & Control	Change control plan	Critical chain schedule Update
13	11/14	Closeout	Close out report Dress Rehearsal	Change control plan Update
14	11/21	HOLIDAY		
15	11/28		Dress Rehearsal	Update (due 11/26) Dress Rehearsal (11/28)

## **Additional Information the Provost Wants Us to Provide to You**

### *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](http://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, <http://policy.usc.edu/scientific-misconduct>.

The Viterbi School of Engineering adheres to the University of Southern California's policies and procedures governing academic integrity as described in *SCampus*. Students are expected to be aware of and to observe the academic integrity standards described there, and should expect those standards to be enforced in PPD 570, because they will be.

### *Support Systems*

#### **Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call**

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention, [engemannshc.usc.edu/counseling](http://engemannshc.usc.edu/counseling).

#### **National Suicide Prevention Lifeline – 1 (800) 273-8255**

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, [www.suicidepreventionlifeline.org](http://www.suicidepreventionlifeline.org).

#### **Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call**

Free and confidential therapy services, workshops, and training for situations related to gender-based harm, [engemannshc.usc.edu/rsvp](http://engemannshc.usc.edu/rsvp).

#### **Sexual Assault Resource Center**

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, [sarc.usc.edu](http://sarc.usc.edu).

#### **The Office of Disability Services and Programs**

Provides certification for students with disabilities and helps arrange relevant accommodations, [dsp.usc.edu](http://dsp.usc.edu).

#### **Student Support and Advocacy – (213) 821-4710**

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic, [studentaffairs.usc.edu/ssa](http://studentaffairs.usc.edu/ssa).

#### **USC Emergency Information**

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible, [emergency.usc.edu](http://emergency.usc.edu).

*USC Department of Public Safety – UPC: (213) 740-4321 24-hour emergency or to report a crime.* Provides overall safety to USC community, [dps.usc.edu](http://dps.usc.edu).