



**ISE 495ax: Senior Project Design**

**Fall 2019 — Wednesday - 6:30-10:00 pm**

**Location: KAP160**

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<p><b>Coach: Prof. James Moore</b>  <b>Office: GER203</b>  <b>Office Hours: M, T, W 3-5 PM</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>Blackboard (Bb) Help:</b>  <b>(213) 740-5555 option 2</b>  <b>email: <a href="mailto:blackboard@usc.edu">blackboard@usc.edu</a></b></p>

**Catalogue Course Description**

Preparation and development of the senior project proposal. Open only to industrial and systems engineering majors.

**Course Overview**

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. This activity includes:

- Preparation and development of the senior project proposal.
- Identification and definition of appropriate engineering standards.
- Identification of constraints that will help define and bound the project proposal.

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 USC’s undergraduate ISE curriculum. Students apply their classroom knowledge to a real project in a real ISE work setting, e.g., on the manufacturing floor, in a healthcare clinical setting, at logistics distribution facilities, etc.

In the past decade, U.S. manufacturing industries such as automotive and aerospace have adopted, implemented, and evolved Lean approaches based on the Toyota Production System,

Six Sigma techniques, and other enterprise change models. Aerospace, healthcare and logistics industries have adopted Lean principles to significantly reduce cost and time requirements and 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 **ISE 495ax** 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;
- to navigate the politics of a company and how it impacts a team's progress;
- meet aggressive deadlines with 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 their corresponding value to an organization; and
- describe opportunities for applying industrial engineering principles to the client's future work assignments

#### **Prerequisite / Co-requisite**

- ISE225
- ISE460
- Either DSO 435 or ISE 382

#### **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.

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

ISE 495ax 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 via 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*.

## **Format Requirements for Submissions**

- Presentations: MS Power Point
- Documents: PDF
- Project Schedules: PDF
- At a minimum, students are expected to be able to:
  - prepare professional papers and presentations in the English language using proper citation;
  - use multimedia in **MS PowerPoint** with embedded audio and/or video that begins automatically with the beginning of a presentation (Please test this. Points will be deducted if embedded media do not operate properly);
  - prepare and present a Preliminary Design Review (PDR, See Guidelines for preparing for PDR);
  - access a computer with a web camera and microphone, preferably with a headset with microphone and headphone;
  - be proficient with the use of the BlackBoard system (NO work will be accepted by email unless previous arrangements have been made); and
  - convert report files to PDF

## **Grading Breakdown**

<b>Course Component</b>	<b>Weight</b>
<a href="#">Progress Update Reports</a> to client & professors (5 submissions at 2% each)	10%
<a href="#">Preliminary Design Review</a> Report	20%
<a href="#">Presentation</a> , Interim (5%); Dress Rehearsal (15%)	20%
<a href="#">Sponsor Evaluation</a>	25%

Instructors' Evaluation <ul style="list-style-type: none"> <li>• Peer Evaluations of your work</li> <li>• Quality of peer Evaluations you provide</li> <li>• Interim feedback from the sponsor</li> <li>• Individual contributions to each progress report</li> <li>• Quality of Interaction with other team members</li> <li>• Participation</li> </ul>	25%
Total	100%

Punctuality is considered in the evaluation of performance. This relates to meetings of your team, punctual class attendance, and 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.

***Guidelines for Preparing Progress Update Report***

Any project is measured upon three main criteria. Scope, budget, schedule. An update report should convey progress in those three areas of standing concern. The client wants to know that what was promised in the Scope document can be accomplished.

Typical progress update reports include the following, but not all items will be in all reports

1. Progress toward scope, budget & schedule goals
2. Progress toward breaking down of larger goals into smaller ones
3. Major accomplishments (milestones) attained as outlined in the submitted schedule
4. Issues encountered and requests for client help

***Guidelines for Preparing Preliminary Design Review (PDR)***

Additional details are available on the Bb site.

CONTENT (This is to be completed by team members)

1. Mission Objective.
2. Architectural Design Development – Present the chosen architectural design.
3. Requirements – List requirements that are derived and those that have originated from the sponsor or other stakeholders.
4. Concept of Operations – Describe how the system will operate.
5. Validate and Verify – Formulate a test plan.
6. Interfaces and Interface Control Document (ICD) – List the mechanical, electrical, thermal and operational boundaries.

7. Mission Environment.
8. Technical Resource Budget Tracking – Identify and estimate resource budgets if necessary.
9. Risk Management – Identify risks to safety, performance, and the program
10. Configuration Management and Documentation.

## PROJECT MANAGEMENT

## CONCLUSIONS

## REFERENCES

## APPENDIX

### *Guidelines for Preparing Preliminary Design Review (PDR) Presentations*

#### *Interim Presentation 1 of PDR*

- The first presentation is nominally 5 slides, a maximum 6 minutes, with audio recorded on a PPT file.
- Content should be per guidelines for preparing PDR at the initial stages (nominally Content items 1-4)

#### *PDR Dress Rehearsal Presentation*

The **Dress Rehearsal** presentation is the review of the PDR prior to presentation to the client . As such, content should be complete and PDR ready.

There is probably much more each team will want to say at this point, but the purpose of the **Dress Rehearsal** is only to understand and approve the strategy for the **Final Presentation**. Teams are **strongly** encouraged to make available detail information in a separate file, submitted to *Bb* for review if the instructors have any questions.

**Please Do Not** make arrangements for the final presentation with the client until this presentation has been reviewed and approved by the instructors.

#### *Sponsor Evaluation*

Each client will be given an evaluation sheet outlining the points below to provide the team with feedback at the end of each semester, and possibly during the semester.

1. Execution of project
2. Quality of work
3. Creativity
4. Improvement of team over course of project
5. Client communication and interaction
6. Responsiveness of team

7. Ability to take ownership of project
8. Tasks completed on time

### **Schedule**

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

<b>Week</b>	<b>Date</b>	<b>Deliverables</b>
<b>1</b>	8/28	
<b>2</b>	9/4	
<b>3</b>	9/11	Progress Update Report 1 – email to the client
<b>4</b>	9/18	
<b>5</b>	9/25	Interim Presentation 1 of PDR with coach
<b>6</b>	10/2	Progress Update Report 2 – email to the client
<b>7</b>	10/9	
<b>8</b>	10/16	PDR Dress Rehearsal
<b>9</b>	10/23	Progress Update Report 3 – email to the client
<b>10</b>	10/30	Complete PDR with client approval
<b>11</b>	11/6	Peer evaluation
<b>12</b>	11/13	Progress Update Report 4
<b>13</b>	11/20	
	11/27	<b>Thanksgiving Holiday</b>
<b>14</b>	12/4	
<b>15</b>	12/11	Progress Update Report 5

### **Additional Information the Interim 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).

## APPENDIX

### **Presentations**

*Interim Presentation 1 of PDR*

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- Content should be per guidelines for preparing PDR at the initial stages

*PDR Dress Rehearsal Presentation*

The **Dress Rehearsal** presentation is the review of the PDR prior to presentation to the client . As such, content should be PDR ready.

**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. Do we want to change this to reviewing the entire presentation with team on a one on one basis with the coach?