USC Viterbi School of Engineering

ISE 495ab: Senior Project Design

Fall 2015 —Mon, Wed, Fri.—8:00-9:20am
Location: KAP160

Coach: Theodore Mayeshiba	Coach: Raymond Rakhshani
Office: GER216C **Office Hours:** By appointment. **BlueJeans (preferred):** Follow link on Blackboard site **Contact Info:** **email:** mayeshib@usc.edu; **USC**: (213) 740-0867; Skype: Mayeshiba; Office: (213) 342-1815	**Office:** GER216C **Office Hours:** By appointment. **BlueJeans (preferred):** Follow link on Blackboard site **Contact Info:** **email:** rakhshan@usc.edu; **USC**: (213) 740-0867;

Blackboard (Bb) Help: *(213) 740-5555 option 2*
Email: blackboard@usc.edu

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.

- 495a
  - 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

- 495b
  - 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

The Course

Overview

This course serves as the experiential capstone in the undergraduate ISE curriculum -- to apply your classroom knowledge to a real project in a real work setting. In the past decade the U.S. manufacturing industries such as automotive and aerospace adopt, implement and evolve "Lean" approaches based upon the Toyota Production System, Six Sigma, and other enterprise change models. Lean has led to significant reductions in cost and time to produce products with superior quality and performance. It is from this framework and perspective, that the student will see how ISE tools can be used to analyze and frame problem statements in real life situations.

The students in this class will learn:

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

Prerequisite / Co-requisite

Not available for graduate credit
Senior standing in industrial and systems engineering
Open only to industrial and systems engineering students

495A Prerequisite(s): ISE-225 and ISE-310 and one from (ISE-382 or IOM-435)

495B Prerequisite(s): ISE 435 and one from ISE 370 or ISE 470

Co-Requisite (s): None
Concurrent Enrollment: None
Recommended Preparation:

- Many projects require a formal statistical analysis. If unfamiliar, read: **Engineering Statistics**, 5th Ed, *Montgomery, Runger, and Hubele*, John Wiley and Sons, New York, NY
- Many projects require an analysis as outlined in ISE460: *Park, Chan S.,* **Contemporary Engineering Economics**, 5th Edition, Prentice Hall, (2011)
- Capable of preparing professional papers and presentations in the English language using proper citation
- Ability to produce documents in MS PowerPoint with embedded audio and/or video which begins automatically upon first click

Course Notes

This course is Web-Enhanced with high reliance on Blackboard. 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 (Course Documents).

Technological Proficiency and Hardware/Software Required

- Access to a computer with a web camera, microphone. Preferably with a headset with microphone and headphone.
- Proficiency with the use of BlueJeans
- Proficiency with the use of the BlackBoard system. NO work will be accepted by email unless previous arrangements have been made.
- Proficiency to use multimedia on MS PowerPoint including inclusion of audio files which begin automatically with the beginning of your presentation

Required Readings and Supplementary Materials

Texts

- Fundamentals of Project Management, James P. Lewis, American Management Association, 2002 (complete by 11/10 for midterm2)
- Installing Efficiency Methods, C. E. Knoeppel, The Engineering Magazine Company, 1917 republished by Google Books. Available on Blackboard site under Course Documents. (complete prior to class 9/5)
- Introduction to Industrial and Systems Engineering, *Turner, et al*, Prentice Hall, ISBN 0-13-481789-3

Grading Breakdown

	495A	495B
Progress Update Reports 495a (2 presentations at 5% each plus weekly updates at 5% cumulatively) 495b (4 submissions at 5% each)	15%	20%
Peer Review (2) (ability to evaluate others) (see Assignment section of Blackboard for details)	10%	20%
1st Midterm	15%	NA
2nd Midterm	20%	NA
Final Sponsor Evaluation (Report/ Presentation)	25%	30%
Instructors Evaluation • Peer review • Interim feedback from sponsor and representatives • WBS contribution for each progress report • Interaction with team members • Attendance	15%	30%
Total	100%	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.

Statement for Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to the professor(s) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

Statement on Academic Integrity

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. *Scampus,* the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A: http://www.usc.edu/dept/publications/SCAMPUS/gov/. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: http://www.usc.edu/student-affairs/SJACS/.

Emergency Preparedness/Course Continuity in a Crisis

In case of a declared emergency if travel to campus is not feasible, USC executive leadership will announce an electronic way for instructors to teach students in their residence halls or homes using a combination of Blackboard, teleconferencing, and other technologies.

Schedule: See calendar at conclusion of syllabus.

(Timing is **approximate** and subject to **change**. This is a living document, and will be modified based on the course requirements.)

NOTES:

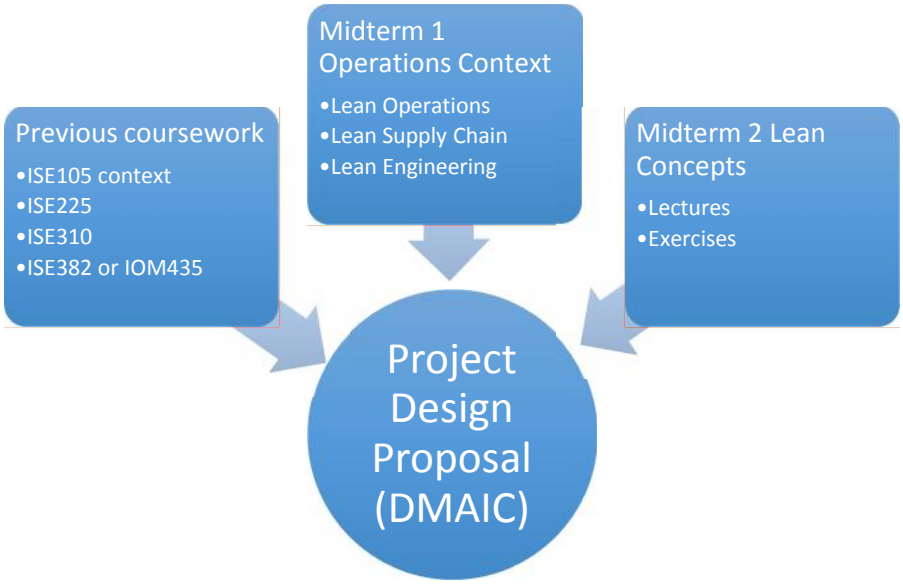
495A Presentation / Report Grading Rubric

Phase	Below Expectation	Expectation	Exceeds Expectation
Define (Presentation)	Problem Statement from client	Problem Statement from client Definition of problem • Key measures used in evaluating success • Client overview • Eng'r standards applicable to approaching this problem	Problem Statement from client Definition of problem • Key measures used in evaluating success • Client overview • Eng'r standards applicable to approaching this problem • Impact on business issues • SIPOC, Pareto, other tools to validate • Identification of possible constraints • WBS breakdown
Measure (Developed during weekly reports)	All items in Define plus: Identification of key input and output variables VSM	All items in Define plus: Identification of key input and output variables VSM Quantify "current state"	All items in Define plus: Identification of key input and output variables VSM Quantify "current state" Identify "future state"
Analyze (Dress rehearsal presentation)	Use of concepts covered in previous coursework to perform "gap analysis"	Use of concepts covered in previous coursework to perform "gap analysis" Discussion of alternative solutions	Use of concepts covered in previous coursework to perform "systems analysis" Discussion of alternative solutions Select single "best" alternative

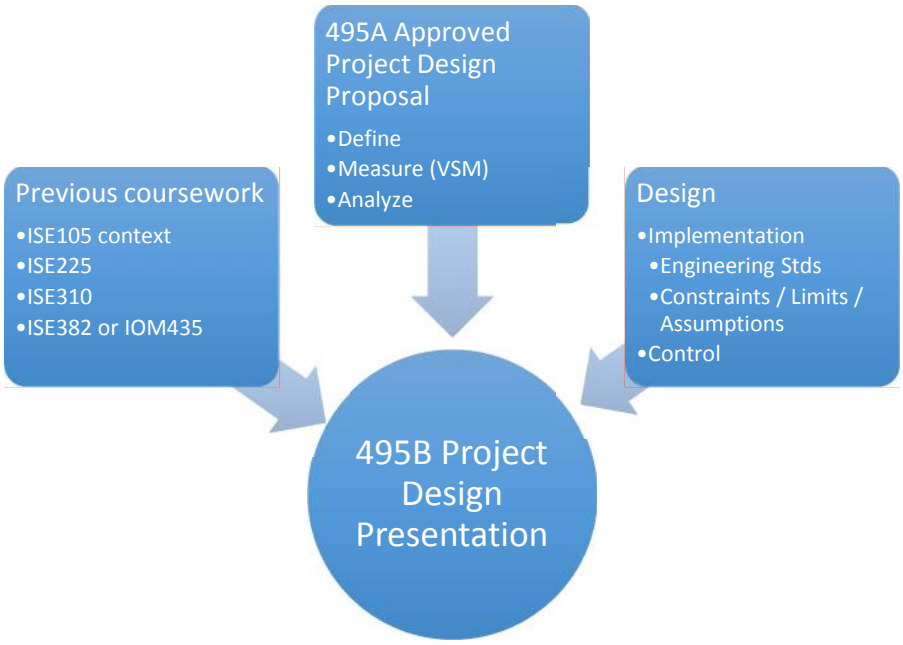
495B Presentation / Report Grading Rubric

Phase	Below Expectation	Expectation	Exceeds Expectation
Improve Presentation 2	Outline recommended system	Design recommended system	Design recommended system and implement
Control Presentation 3	Discuss suggested method of control to maintain your recommended system	Design a client approved method of control to maintain your recommended system	Design and implement a method of control to maintain your recommended system executed by the client
Report		Engineering standards used Constraints overcome DMAIC review System design summary	

Flow of Course – Organization / Inter-relationship of Topics 495A



Flow of Course – Organization / Inter-relationship of Topics 495B



MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
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3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
Orientation 24	25	Bio Presentation 26	27	28	29	30
495B Presentation 31 o						

AUGUST

2015

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JULY 2015

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28	29	30				

SEPTEMBER 2015

NOTES:

Click here to add notes.

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
		Project Team selection 1 2	3	LEAN / DMAIC 4	5	6
LABOR DAY HOLIDAY 7	8	VSM 1 9	10	VSM 2 11	12	13
No class meeting - This is a chance for your team to meet with your client. 14	15	Quality / Variance 16	17	SIMULATION GROUP 1 18	19	20
495B – Presentation 21	22	23	24	SIMULATION GROUP 2 25	26	27
MidtermGroup 1 due 28	29	Project Management 30		SIMULATION GROUP 3		

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SEPTEMBER 2015

AUGUST 2015

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OCTOBER 2015

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NOTES:

Click here to add notes.

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
			1	SIMULATION GROUP 3 2	3	4
Midterm Group 2 due 5	6	7	8	9	10	11
Midterm Group 3 due DEFINE / MEASURE PRESENT. 12	13	DEFINE / MEASURE PRESENT. 14	15	DEFINE / MEASURE PRESENT. 16	17	18
495B – Presentation 19	20	5S 21	22	23	24	25
MidtermGroup 1 due 26	27	TPM 28	29	30	31	

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OCTOBER

2015

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NOVEMBER 2015

NOTES:

Click here to add notes.

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
						1
2	3	TOC 4	5	6	7	8
Midterm 2 9	10	11	12	13	14	15
16	17	5S 18	19	20	21	22
495B – Presentation *Dress rehearsal* 23	24	Thanksgiving Holiday 25	Thanksgiving Holiday 26	Thanksgiving Holiday 27	Thanksgiving Holiday 28	Thanksgiving Holiday 29
Dress Rehearsal 30 o		Dress Rehearsal		Dress Rehearsal		

NOVEMBER

2015

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OCTOBER 2015

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DECEMBER 2015

NOTES:

Click here to add notes.

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Dress Rehearsal	1	Dress Rehearsal 2	3	Dress Rehearsal 4	5	6
Presentations: 8:00a 11:00a 2:00p 5:00p 7	8	9	10	11	12	13
14	15	Last Day for Presentations Last Day of Classes 16	: 17	18	19	20
21	22	5S 23	24	25	26	27
28	29	30	31			
Dress Rehearsal o		Dress Rehearsal		Dress Rehearsal		

DECEMBER

2015

NOVEMBER 2015

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JANUARY 2016

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NOTES:

Click here to add notes.