

Industrial & Systems Engineering (ISE)

Systems Architecting & Engineering (SAE)

ISE 506: Lean Operations (3 units)

SAE 551: Lean Operations (3 units)

The study of lean principles and practices as applied to automotive, aerospace, healthcare and other industries.

Semester Spring 2019
Lecture Time Friday 5:10-7:50 PM
Instructor Prof. Ted Mayeshiba (mayeshib@usc.edu) (best way to contact)
Office Hours: GER242A (by appt)
Office phone: (213) 740-0867
Email for personal issues only
Response to emails within 24 hours

T.A. Akshay Akulwar (akulwar@usc.edu) (personal issues only)
Office hours: Please use the Discussion Board for questions
Response to Discussion Board 0.5 days
Response to emails within 24 hours.

Introduction and Purposes

- **Objective:** To enhance the students' understanding and appreciation of the importance of lean operation concepts for manufacturing and service enterprises, their resources, the related challenges and problems, and the related tools and technologies. Systems thinking will be emphasized.
- **Description:** Study of various aspects of integrated manufacturing and service enterprises including management, design and production functions, interfaces, and related resources and information systems.
- **Approach:** This course introduces the role of lean thinking in the manufacturing or service (operations) enterprise and its connections with society, economy, and environment. The course will address both theoretical and applied aspects of the topic. Alternative views of lean operations will also be introduced. Ultimately, assessment of learning is provided through the application of learned principles to a process with which the student is familiar and submits as an end of term project. In pursuit of this goal, to the extent possible, the course will use a collaborative learning approach; meaning participation in class is critical to everyone's learning experience. The instructor then functions more as a facilitator to accomplish this goal.
- **Learning Outcomes:** Demonstrate mastery of subject material through research and production of a paper describing the application of Lean concepts learned in class to a project of the student's choosing.

Course Presentations

The course relies heavily upon student interaction. One way to achieve this is through in-class presentation. It is the instructor's belief that learning is best done in a collaborative environment. All students bring value to the learning experience of others. Because this class is both for the benefit of on campus students and DEN students, ALL student presentations will take the following form (on campus and DEN):

1. Presentations will be submitted on PowerPoint as a "slide show".
2. Presentations will be no more than 2 minutes in length (except Final Presentation – 7 minutes)
3. Transitions between slides are to be built into the presentation.
4. Audio, if used, must automatically start with the presentation.
5. Due date for all presentations, unlike other homework, will be Thursday at 11:59PM (Pacific Time) prior to class.

This does not pertain to the final presentation.

Course Website

This course will rely on the DEN D2L course website, located at <http://den.usc.edu>. Go to the website, login, and click either the ISE506 or the SAE 551 link. The toolbar on the left-hand side of the page will provide access to course announcements, live and recorded lectures, assignment submission, discussion board, and other information.

Course Schedule

 on following page

Students are expected to frequently check announcements on the course website and their email account registered with DEN for any schedule updates or changes.

DATE	BEFORE CLASS	IN CLASS	IN CLASS
	Reading in preparation for class	Student Presentations	Topic
11-Jan	Goal, MTCTW, LEV Part1, LT Ch. 1		Course Introduction / Overview
18-Jan	TW 1-4		Start of Your Journey
25-Jan	LT Introduction -3		VALUE Toyota Production System
1-Feb	TAL, TW 8, 9	TW Presentation	Process VSM
8-Feb	TW 10,13		Heijunka / Visual Management
15-Feb	TW 11		Quality / JIT
22-Feb	TW 17, LT 12		Continuous Improvement / Lean SCM
1-Mar	TW 5-6, 15	Beer Game	Lean Product Development
8-Mar		MIDTERM 1	
15-Mar		SPRING BREAK	
22-Mar	LEV Part 3		Change Management
29-Mar	TW 16, 21		Systems Thinking, Data Information, Viz Mgmt (2), Lean SCM (2)
5-Apr			Lean Finance / Std. Costs, Healthcare
12-Apr			Alternative View / Learning Organization
19-Apr		MIDTERM 2	
26-Apr		All Presentations & Final Paper Due	Presentations
3-May			Presentations

TW – Toyota Way text

LT – Lean Thinking text

TAL – This American Life podcast (link on D2L)

LEV – Lean Enterprise Value text

HOMEWORK

CLASS DATE	HOMEWORK DUE BEFORE CLASS	POINTS
	Time varies, check assignment description on D2L	
11-Jan		
18-Jan	<ol style="list-style-type: none"> 1. Post student bio 2. Complete VALUE score 3. Abstract of your project (Proposed) (not graded) 	P/F
25-Jan	<ul style="list-style-type: none"> • Abstract of your project / Stakeholder Identification 	2
1-Feb	<ul style="list-style-type: none"> • TEAM – Analysis of Toyota Way Principles vs. other companies 	1
8-Feb	<ul style="list-style-type: none"> • VSM of your project iteration 1 – (form) (not graded) 	P/F
15-Feb	<ul style="list-style-type: none"> • VSM of your project iteration 2 – (takt time calculations) 	1
22-Feb	<ul style="list-style-type: none"> • VSM of your project iteration 3 – (data / quality metrics) 	1
1-Mar	<ul style="list-style-type: none"> • TEAM - Beer Game & Analysis 	2
8-Mar	<i>Midterm 1</i>	
15-Mar	SPRING BREAK	
22-Mar	Abstract / VSM - Improvement	2
29-Mar	Case Study 1	5
5-Apr	Case Study 2	5
12-Apr		
19-Apr	<i>Midterm 2</i>	
26-Apr	Presentation / Paper	10 / 40
3-May	VALUE Score 2	P/F

Course Readings

- Required Text:
 - *Lean Enterprise Value*, Murman, et al., Palgrave, 2002, ISBN 0-333-97697-5 (LEV)
 - *Lean Thinking*, Womack and Jones, Simon & Schuster, 2003, ISBN 0-7432-4927-5. (LT)
 - *The Toyota Way*, Liker, Jeffrey K. McGraw-Hill, 2004, ISBN 0-07-139231-9 (TW)
- Reference Text for those who are approaching this course with limited sense of a technical workplace or context of Lean, it is recommended that these books be read to offer background. Items will be taken from these texts in the course of class, and it may help in understanding these topics. (Optional):
 - *The Goal*, Goldratt & Cox, North River Press, 2004, ISBN 0-88-427178-1
 - *The Machine That Changed the World*, Womack, Jones, and Roos, 1990, ISBN 0-89256-350-8 (MTCTW)
 - *On the Mend*, Toussaint, Gerard, Adams, Lean Enterprise Institute, Inc. 2010, ISBN 978-1-934109-27-4
- Additional documents will be provided through the class website.
- NOTE: These books are available from online booksellers. Students are encouraged to take advantage of this option. These books are not available in the bookstore.

Assignment Submission

- Do NOT email submissions to DEN (denhw@usc.edu), the professor, or the TA. They will not be accepted.
- All assignments must be submitted through the Assignment Manager (the “Assignments” tab) on the DEN D2L course website.
- Some major course assignments, when directed by the instructor, will be submitted to the *TurnItIn* system. *TurnItIn* is a plagiarism-detection system that compares student submissions with other submissions, past course submissions, and information available on the Internet. Any submissions reviewed by *TurnItIn* and any that do not follow Academic Integrity standards will be referred to USC Student Affairs.
- To submit an assignment through the Assignment Manager or *TurnItIn* system, click the “Assignments” link on the left-hand side of the course website, find the appropriate assignment on the page, and click “View/Complete” for that assignment. After filling in the appropriate fields and uploading the completed assignment, click the “Submit” link.
- If you have any technical issues with the submission process, email the TA immediately. In lieu of email to TA, take a picture of the assignment with date and time, and email TA within 24 hours to obtain credit.
- Assignments (except for the Toyota HW assignment, midterm and final project/presentation) are due before 4:30 PM. Please check Assignment tab in D2L for final times for those assignments.
- If assignments are submitted after the due date and time, they will receive a penalty of 10% if less than three days past due and a penalty of 50% if less than five days but more than three days past due. Submissions over five days past due will receive zero credit.
- Assignments must follow the correct file naming convention (last_name, first_name HWX.doc or .ppt). “X” should be replaced with the corresponding assignment number (see “Course Schedule” in the syllabus).
- All submissions should be in either the Microsoft Word (.doc), Adobe PDF, or Microsoft PowerPoint (.ppt) format. If you need to use a Microsoft Excel table, please copy or insert these images into a Word, PDF or PowerPoint format prior to submission

Grading

Homework / Participation	20%
Midterm Exam 1	15%
Midterm Exam 2	15%
Final Project Report	40%
Final Presentation (7 minutes)	10%
Total	100%

- **Homework** assignments will be graded based on depth and quality of analysis, and correctness, as well as number and quality of references, and amount of new information (information is not simply repeated from lecture) when applicable.
- **Attendance** is not part of the course grade. However, participation either in the classroom or on the discussion board is incorporated into the course grade. Participation will likely improve the chances of a student receiving the higher grade if the student is on the bubble between two grades.
- Elements of **participation** in the course may take different forms.
 1. Participation during class. Comments, additions and discussion participation will be considered toward a participation grade.
 2. Participation in *Discussion Boards* (see Discussion Boards below for more details) on D2L is another way to participate in class.
- The **midterms** will be conducted online through the course website. Both on-campus and DEN students will complete the exam online. The exam will be available for a predetermined time window (usually 5PM – 8PM, Pacific Time) on the scheduled date. Any students who have a conflict with this date must notify the professor and the TA no later than two weeks before the exam.
- The **final project** is a written report and oral presentation on a topic selected by the student and **approved** by the professor, which will analyze the Lean Operations cycle for a process (such as product manufacturing or service delivery). The project should involve a process analysis using Lean Operations tools and principles as well as demonstrate the student’s knowledge and understanding of the material presented in the course. There must be one analysis tool used/addressed in the project from after the midterm. Additional information will be provided on the course website.
 - Report (Written paper, format guidelines will be provided)
 - Presentation (PowerPoint presentation, given in-class by on-campus students, and in-class or via WebEx by DEN students)

Examples of Presentation Schedule – Final schedule will be posted after midterm exam.

Presentation Schedule, 1 (19)		Presentation Schedule, 2 (15)	
Time Start	Time Start	Time Start	Time Start
5:10	6:30	4:30	5:34
5:18	6:38	4:38	5:42
5:26	7:46	4:46	5:50
5:34	7:54	5:54	5:58
5:42	7:02	5:02	6:06
5:50	7:10	5:10	6:14
5:58	7:18	5:18	6:22
6:06	7:26	5:26	
6:14	7:34		
6:22 Break	7:42		

Discussion Board and Questions

- Discussion board threads will be created for every lecture/topic in the course.
- Please check the discussion board frequently
- If you have a question from that lecture or on the assignment from that lecture, please post your question to the discussion board within the corresponding thread.
- If you don't receive a response or your question is not sufficiently answered, only then should you email the professor and the TA. Having questions posted to the discussion board not only reduces the number of duplicate emails we must answer but also ensures that the information we provide is available to all students.

What's Expected of Students

- Students are expected to be able to use the following tools to upload and download their assignments, obtain pertinent course information, and participate in class discussions
 - On-campus students: DEN D2L, MS PowerPoint
 - DEN students: DEN D2L, WebEx, MS PowerPoint
 - Students are expected to follow the standards of appropriate online behavior. The protocols defined by the USC Student Conduct Code must be upheld in all aspects of class. Examples of inappropriate online behavior include but are not limited to:
 - Posting inappropriate material
 - SPAM to the class
 - Online flaming
 - Offensive language
- For more information, please visit <http://www.usc.edu/student-affairs/SJACS/>
- In the event of any technical breakdown, students are expected to contact the professor or TA ASAP by email or text message.

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 me (or to TA) 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.

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. 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.

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.

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.

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.

The Office of Disability Services and Programs

Provides certification for students with disabilities and helps arrange relevant accommodations, 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.

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.

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.

USC Viterbi

School of Engineering

Honor Code

Engineering enables and empowers our ambitions and is integral to our identities. In the Viterbi community, accountability is reflected in all our endeavors.

Engineering+ Integrity

Engineering+ Responsibility

Engineering+ Community

Think good. Do better. Be great.

These are the pillars we stand upon as we address the challenges of society and enrich lives.