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   Fall 2021
Lecture Time   Friday 5:10-7:50 PM
Instructor   Prof. Ted Mayeshiba (mayeshib@usc.edu) (best way to contact)
                     Office Hours: https://calendly.com/ise_mayeshib
                     Email for personal issues only
                     Response to emails nominally 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.

Approach

Society has reached the point where one can push a button and be immediately deluged with technical and managerial information. This is all very convenient, of course, but if one is not careful there is a danger of losing the ability to think. We must remember that in the end it is the individual human being who must solve the problems.

—Eiji Toyoda, *Creativity, Challenge and Courage*, Toyota Motor Corporation, 1983

- **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 Readings

- Required Text:
  - *Lean Enterprise Value,* Murman, etal., 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, 2021, ISBN 978-1-260-46851-9 (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.

Course Schedule

DATE	BEFORE CLASS	IN CLASS	IN CLASS
	Reading in preparation for class	Student Presentations	Topic
27-Aug-2021	Goal, MTCTW, LEV Part1 & 3, LT Ch. 1		Course Introduction / Overview Start of Journey
3-Sep-2021	TW P1, LT 2	Bio Presentation -	Foundational Concepts VSM / A3
10-Sep-2021	TW P2, LT 3, LEV 7, 8		VALUE-TPS, VSM analysis
17-Sep-2021	TW P4, P5	TW Presentation	JIT / Flow
24-Sep-2021	TW P6		Quality
1-Oct-2021	TW P8		Lean Supply Chain Management
8-Oct-2021	TW P9, LT 12	Beer Game	Enterprise Analysis Tools (EVSM)
15-Oct-2021			RECESS
22-Oct-2021	TW P7		MIDTERM
29-Oct-2021			Lean Product Development / Data Info. / Viz Mgmt.
5-Nov-2021	TW P11		Change Management
12-Nov-2021	LEV 10		Data, Information, Knowledge, Health Care / Case Study A3
19-Nov-2021			Lean Finance / Sustainability
26-Nov-2021			THANKSGIVING
3-Dec-2021	LEV 11		Alternative View / Learning Organization
10-Dec-2021		Presentations (14) 7 min + 1	

Students are expected to frequently check announcements on the course website and their email account registered with DEN for any schedule updates or changes.
TW P # (Principle #) – Toyota Way text
LT – Lean Thinking text
TAL – This American Life podcast (link on D2L)
LEV – Lean Enterprise Value text
MTCTW – Machine That Changed the World

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 professor immediately. In lieu of email to professor, take a picture of the assignment with date and time, and email 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 (5 pts. X 3)	15%
Midterm Exam	20%
Project Segment Drafts (2 pts. X 5)	10%
Final Project Report	40%
Final Presentation (7 minutes)	10%
Participation	5%
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 **midterm** will be <u>conducted online</u> 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 or via WebEx by DEN students)

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.

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

Counseling and Mental Health - (213) 740-9355 – 24/7 on call
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention, studenthealth.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, 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, studenthealth.usc.edu/sexual-assault.
Office of Equity and Diversity (OED) - (213) 740-5086 | Title IX – (213) 821-8298
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants, equity.usc.edu, titleix.usc.edu.
The Office of Disability Services and Programs
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. dsp.usc.edu.
USC Campus Support and Intervention - (213) 821-4710
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student, campussupport.usc.edu.
USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call
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, dps.usc.edu, emergency.usc.edu.
USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call
Non-emergency assistance or information, dps.usc.edu