

SIE 482
Lean Operations and Manufacturing Systems
Spring 2025

Class hours: Tuesdays & Thursdays 2:00 – 3:15 p.m.

Class Location: Gittings Bldg. Rm 207

Course URL: This course uses D2L

Instructors: Anne McBride, Jim Pekny

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Office hours: By appointment; will attempt to be available after class

Designation: Elective in IE, SE, and EM Program

Prerequisite(s):

1. Concurrent registration, Probability and Statistics – SIE305

Text:

Goldratt, *The Goal*, North River Press

Overall educational goals:

- Understand relationship between Work in Progress, cycle time, takt
- Understand the integration of batch size, setup, manufacturing processes, and waste
- Understand techniques to sustain lean implementation
- Provide students with a comprehensive overview of lean manufacturing allowing them to contribute immediately to manufacturing, operations or service industries.

Lecture Notes: Lecture notes will be uploaded by 10:00 pm the day prior to class date. Therefore, students are required to visit the course web site and have materials ready before they come to class.

Course Content:

	Week	Content Description	Assignment
1	Jan 16 (Thu)	Syllabus review, overview of major lean topics, history and fundamental purpose of lean manufacturing	HW: Read <i>The Goal</i> Due: Tuesday, Feb 4
2	Jan 21,23	Capacity and utilization Change Management	HW 1: Capacity / utilization model Due: Tuesday Jan 28
3	Jan 28, 30	Before lean simulation (Lego rocket); after lean simulation (Lego rocket);	HW 2: Goal paper – 3 to 4-page overview of key lean strategies

		history and fundamental purpose of lean manufacturing (cont. if needed).	Due: Tuesday Feb 4
4	Feb 4, Feb 6	<i>The Goal</i> discussion	Quiz 1: <i>The Goal</i>
5	Feb 11, 13	Visual Control Systems; 5S	HW 3: real-life visuals Due: Tuesday, Feb 13
6	Feb 18, 20	Pull systems; WIP/takt/inventory overview; inventory reduction; line balancing	HW 4: Kanban system design Due: Tuesday Feb 25 Quiz 2: Visual Controls, 5S
7	Feb 25, 27	Value stream mapping and process mapping; plan for every part	HW 5: Value stream map Due: Tuesday, Mar 4 Quiz 3: Kanban and inventory management
8	Mar 4, 6	Mid-term review; Midterm Exam	Mid-term exam: Thursday, Mar 6
9	Mar 11, 13	Spring Break	
10	Mar 18, 20	Setup Reduction (SMED), Error proofing (poka-yoke)	HW 6: SMED, error proofing Due: Tuesday, Mar 25
11	Mar 25, 27	Toyota Production System; Discrete Event Simulation	Quiz 4: setup reduction, error proofing
12	Apr 1, 3	Total Productive Maintenance (TPM); Traditional Maintenance	HW 7: TPM formula, calculation, card for machine Due: Tuesday, Apr 8
13	Apr 8, 10	Work measurement techniques	HW 8: Time study analysis Due: Tuesday, Apr 15
14	Apr 15, 17	Standard work sustainment; interrelationships of lean concepts; Work cell design and optimization	HW 9: Interrelationships Due: Tuesday, Apr 22 Quiz 5 Work Measurement
15	Apr 22, 24	Variability reduction	
16	Apr 29, May 1	Lean Sigma project	HW 10: Lean Sigma project plan Due: Tuesday, May 6 Quiz 6 Variability reduction
17	May 6	Review for Final Exam	
	May 12 (Mon)	Final Exam	3:30-5:30pm

Grading:

1. Class homework: 25 %
2. Quizzes: 20 %
3. Midterm Exam: 25 %
4. Final Exam: 30 %

Course Rules:

1. Homework needs to be done individually unless otherwise instructed. Paper copies will usually be expected as well as loading to D2L. Homework assignments received after the D2L deadline will be graded at 50% off. Homework not turned in within 7 days of D2L deadline will receive a zero grade.
2. For group projects, each group should submit a single report listing all names involved. The same group must be used throughout the semester. Each group member must contribute equally to all projects.
3. Students are expected to attend all lectures.
4. The instructor reserves the right to give a pop quiz at any time.
5. Quizzes typically are on Thursday. You cannot miss any quizzes or exams. Missed quizzes and exams will result in a zero grade.
6. If a student chooses to contest any grades, they must do so within seven (7) calendar days of grade disbursement.
7. All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion; Absences pre-approved by the UA Dean of Students (or Dean's designee) will be honored.
8. Students are not allowed to use pagers, cell phones and/or other unapproved electronic devices during the class.
9. Plagiarism and/or cheating is not allowed to any extent for assignments, quizzes, and exams.
 - a. Any and all uses of generative artificial intelligence (AI)/large language model tools such as ChatGPT, Dall-e, Google Bard, Microsoft Bing, etc. will be considered a violation of the Code of Academic Integrity, specifically the prohibition against submitting work that is not your own. This applies to all assessments in the course, including case studies, written assignments, discussions, quizzes, exams, and problem sets. The following actions are prohibited:
 - entering all or any part of an assignment statement or test questions as part of a prompt to a large language model AI tool;
 - incorporating any part of an AI-written response in an assignment;
 - using AI to summarize or contextualize reading assignments or source materials; and submitting your own work for this class to a large language model AI tool for iteration or improvement.
10. Threatening behavior by students is prohibited (refer to the University policy)
11. Students with Disabilities: If you anticipate the need for reasonable accommodations to meet the requirements of this course, you must register with the Disability Resource Center (DRC) and request that the DRC send official notification of your accommodation needs as soon as possible. Please plan to meet with one of us by appointment to discuss accommodations and how the course requirements and activities may impact your ability to fully participate.
12. The information contained in the syllabus (except the grade and absence policies) may be subject to change with reasonable advance notice, as deemed appropriate by the instructors.