

Lean Production Systems

EIN 4451 Section 1234

Class Periods: MWF, period 7, 1;55-2;45 PM

Location: Old Florida Gym

Academic Term: Fall 2016

Instructor:

Suleyman Tufekci

Email Address: tufekci@ise.ufl.edu

Office Phone Number: 352 294 7725

Office Hours: M,W 9:00-10:30 am Weil 468

Teaching Assistants:

Please contact through the Canvas website

Course Description

History of manufacturing. Principles, design, and analysis of lean manufacturing systems. Small lot production, setup-time reduction, continuous improvement. Principles and control of push and pull manufacturing systems. Production planning and operations scheduling (3 credits).

Course Pre-Requisites / Co-Requisites

ESI 4312 Operations Research I, STA 4321 Mathematical Statistics I.

Course Objectives

In this course, we will cover the following topics: history of manufacturing systems, design of different manufacturing systems, design and control of lean manufacturing systems, and planning and control problems encountered in manufacturing systems. At the end of the semester the students should have a basic understanding of the design, operation and control of lean manufacturing systems and be able to use quantitative methods to model, analyze, and optimize such systems.

Materials and Supply Fees

N/A

Professional Component (ABET):

Prepares our graduates to take on a leading role in process improvements, Kaizen teams and elimination of waste to transform manufacturing systems into lean just in time manufacturing systems.

Relation to Program Outcomes (ABET):

Outcome	Coverage*
a. Apply knowledge	Medium
b1. Conduct experiments	low
b2. Statistical design of experiments	medium
c. Design	low
d. Function on teams	
e. Solve problems	medium
f. Professional and ethical responsibility	Medium
g. Communicate	Medium
h1. Economic impact	High
h2. Global, societal, and environmental impact	High
i. Lifelong learning	High
j. Contemporary issues	
k. Techniques, skills, and tools for degree program	High

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not part of the course.

Required Textbooks and Software

1. Askin, R.G. and J.B. Goldberg. 2002. *Design and Analysis of Lean Production Systems*. John Wiley & Sons Inc. ISBN 0-471-11593-2

Recommended Materials

2. Lecture notes can be supplemented using following textbooks:
 - Askin, R.G. and C.R. Stanridge. 1993. *Modeling and Analysis of Manufacturing Systems*. John Wiley & Sons Inc. ISBN 0-471-51418-7
 - Nicholas, J. 1998. *Competitive Manufacturing Management*. Irwin/McGraw Hill. ISBN 0-256-21727-0
 - Nahmias, S. 2004. *Production and Operations Analysis*. 5th Edition. McGraw Hill/Irwin. ISBN 0-07-241741-2

Course Schedule

Week	Topic	Reading & Lecture Notes	Dates
1	Course introduction World Class Manufacturing	1	
1	World Class Manufacturing Order Winners and Qualifiers	2	
2	Agile Manufacturing	3	
2,3	Lean Manufacturing 5S Principles	4	
3	Lean Manufacturing Standard Work	8	
4	Lean Manufacturing Continuous Improvement & TPM	6	
4,5	Lean manufacturing SMED	5	
5	Lean manufacturing Total Cost of Quality	26, 27	
5,6	Lean Manufacturing - Pull Production (Kanban, CONWIP)	7, 10	
6	Lean manufacturing - Pull Production (JIT)	7, 10	
7	Lean Manufacturing - Pull Production	12, 13, 14	
8	Midterm Exam I		
8	Lean manufacturing - Cellular Manufacturing	23	
9	Lean manufacturing - Value Stream Mapping	25	
9,10	Factory Physics Laws and Bottleneck Scheduling	9, 11	
10	Factory Physics Laws and Bottleneck Scheduling	9, 11	
11	Lot streaming, Heijunka	12, 13, 14	
11	Lot streaming, Heijunka	12, 13, 14	
12	Aggregate Production Planning Linear Programming & Mixed Integer Linear Programming Models	24	
13,14	Operations Management - Materials Requirement Planning	21, 22	

	BOM, Explosion calculus		
	Materials Requirement Planning	21, 22	
14	Midterm Exam II		
15	Materials requirement planning Lot sizing	21, 22	
15	Operations scheduling Single machine scheduling & Flow shop scheduling	15	
15	Operations scheduling Job shop scheduling	16	
16	Project scheduling, Assembly line balancing	17, 18, 19, 20	
16	General Review for the Final		

Attendance Policy, Class Expectations, and Make-Up Policy

- Students will be assigned several homework assignments each with 3-5 questions (some of which may require simple spreadsheet implementations). All homework assignments will be collected *at or prior to the beginning of the class period* on the assigned date. *No* late homework assignments will be accepted and you will get a credit of zero in case you do not submit the homework on time. Homework assignments *submitted at the end of the class period* will be considered as *late submissions* and will receive a credit of 0. Homework policy is non-negotiable.
- The mid-term exams will be given during class periods, and the final exam during the scheduled time.
- There will be several **unannounced short quizzes** throughout the semester (5-8). Question will usually be related to the topic discussed in that day's lecture. Quizzes will affect your final grade by 5%. There will also be some **attendance checks randomly throughout the semester**. Attendance will affect 5% of your grade.
- You are responsible for all announcements made in class.
- You are responsible for printing the assignments from the class web page located at <https://elearning2.courses.ufl.edu>. Paper copies of assignments will not be distributed in class. The instructor will prepare lecture notes to accompany class discussions, which will be made available to the students through the class web site also.
- Requests for re-grading of assignments and exams will be considered only with a written explanation and only within a one-week period from the time graded work is returned in class.
- Grades will be posted on the web. Throughout the semester, you have to ensure that they are entered correctly. Corrections will be considered only within a one-week period after the grades have been posted on the web.
- Please remember to turn off cell phones and pagers before you come to class. If your cell phone or pager rings during class, you will be asked to leave the classroom.
- Please come to class in time. Late arrivals as well as walking out and in during the lectures disrupt the flow of the lecture.
- Final exam will be administered in the last day of our regular class time and in the same classroom.**

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Homework Sets (8)	100 each	20%
Attendance (5)	100 each	5%
Midterm Exam (2)	100	40%
Final Exam	100	30%
Qizzes (5)	100	5%

		100%
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Grading Policy

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:
<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Campus Resources:

Health and Wellness

U Matter, We Care:

If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.