MSE507 – Lean Manufacturing Systems (3 units)

CSUN – Fall 2023; Ticket # 16898; Tuesday: 7:00-9:45 p.m., Room: JD-1553

Instructor

Ghassan "Gus" H. Elias: BS/MS; Industrial/Manufacturing Systems Engineering
- **Expertise:** Engineering Consulting, Decision-Making/Risk Analysis and Facility Planning. Quality Assurance & Control, Industrial Safety & Material Control - global certification programs for installing & commissioning electronic & pneumatic devices in General (Non-Hazardous) Locations, Hazardous 'Classified' Areas & Potentially Explosive Atmospheres.
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- MSEM Department Office: JD-4510; (818) 677-2167
- Faculty Office: JD-3308
- Office hours: Tuesday, 6:00 – 6:50 p.m.

Textbooks (required)

1- **"Lean Thinking: Banish Waste and Create Wealth in Your Corporation"**
By: James P. Womack & Daniel T. Jones. Free Press --- ISBN: 0-7432-4927-5
2- **"Cellular Manufacturing: One-Piece Flow for Workteams"**
Created by: The Productivity Development Team --- ISBN: 156327213X

Additional References

- **"Value Stream Management"** – Authors: Don Tapping, Tom Shuker & Tom Luyster.
- **"Lean Transformation: How to Change Your Business into a Lean Enterprise"** – Authors: Bruce Henderson, Jorge Larco & Stephen Martin.
- **"Quick Response Manufacturing: A Companywide Approach to Reducing Lead Times"** – Author: Rajan Suri.
- **"Becoming Lean: Inside Stories of U.S. Manufacturers"** – Author: Jeffrey Liker.
- **"Implementing a Lean Management System"** – Author: Thomas Jackson.
- **"High-Mix Low-Volume Manufacturing"** – Authors: Michael Mahoney & George Plossl.
- **"5S for Operators: 5 Pillars of the Visual Workplace"** – Author: Hiroyuki Hirano.

Catalog Description

- Concepts and principles of lean manufacturing systems. Methods and tools for application to manufacturing systems improvement. Practices and projects for effective design and implementation of lean manufacturing operation, production, control and quality systems. Prerequisite: MSE 407 or instructor consent.

Course Objectives

- Lean is defined as the elimination of waste (time and cost) in the workplace. Lean thinking principles are emerging as a method to improve the flexibility, reliability, and profitability of enterprises worldwide. Lean thinking is being used to reduce setup times, lot sizes, and inventories. As enterprises have reduced costs and improved quality, the primary competitive measure is the ability to respond to the customer and the marketplace.

This course will cover the basic principles of lean manufacturing and enhance the student's understanding of the following concepts: value, the professional's goals, cellular manufacturing, organizational goals/missions/objectives, the technical value stream (flow, pull, and perfection), the theory of constraints and quick response manufacturing, and the 5S (sort, set in order, shine, standardize and sustain**)** workplace organizational and housekeeping methodology. Safety should be the honorary sixth "S" – a crucial attribute for all enterprises to adopt and master. In a nutshell, this course presents an overview of lean manufacturing concepts and introduces methods and tools designed to put these concepts to work in a manufacturing environment.

STANDARD OPERATING PROCEDURES:

1. Class members are expected to maintain personal and professional standards consistent with the Code of Ethics of the national Society of Professional Engineers, the Preamble and Fundamental Canons of which are as follows:

Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness and equity, and must be dedicated to the protection of the public health, safety, and welfare. Engineers must perform under a standard of professional behavior that requires adherence to the highest principles of ethical conduct. Engineers, in the fulfillment of their professional duties, shall:

- ***Hold paramount the safety, health and welfare of the public.***
- ***Perform services only in areas of their competence.***
- ***Issue public statements only in an objective and truthful manner.***
- ***Act for each employer or client as faithful agents or trustees.***
- ***Avoid deceptive acts.***
- ***Conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession.***

2. Students must submit **ORIGINAL WORK** only.
3. Students are expected to participate in **ALL discussion threads on CANVAS**.
4. Class members are **responsible** for the course material, reading assignments, presentations and discussions.
5. ***Tardy/Late submissions are unacceptable*** ….. **NO EXCEPTIONS!**
6. Class members **MUST** always be **considerate & respectful** to their colleagues and to the instructor.

***** This course syllabus is your contract with the CECS, MSEM and the instructor. Students must read the syllabus thoroughly and adhere fully to ALL of the stated terms and listed guidelines. No Exceptions! *****

NOTE #1: Activate **and** use your CSUN email address for ALL academic correspondences. Do not use your personal email address to communicate with the instructor. Messages from non-CSUN email addresses will **NOT** be acknowledged. Instructor will only utilize SOLAR's email database to communicate with class.

NOTE #2: **The last day to drop classes is 15-Sep-2023. Students must initiate this process; not faculty. Failure to formally drop a course will result in a "WU" grade which is equivalent to an "F" grade; affecting your cumulative GPA detrimentally.**

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Proposed Schedule/Plan

This is a ***TENTATIVE*** syllabus. Depending on the progress of the course material, the syllabus (dates, topics, assignments & exams) ***may change*** if deemed necessary.

Date	Topics	Reading Assignments*
Wk. 1	Course Introduction: Basics & Outline	L.T.: Prefaces // C.M.: ix - xvii
Wk. 2	Lean Principles / Cellular Manufacturing	L.T.: Chapters 1 & 2 // C.M.: Chapter 1
Wk. 3	Lean Principles / Manufacturing Cell Term Project: Groups Formation	L.T.: Chapter 3 // C.M.: Chapter 2
Wk. 4	Lean Principles / Cell Design Elements Term Project: Assignment of Topics	L.T.: Chapter 4 // C.M.: Chapter 3
Wk. 5	Lean Principles & Leap / Teamwork Tools	L.T.: Chapter 5 & 6 // C.M.: Chapter 4
Wk. 6	The Lean Leap / Reflections & Conclusions	L.T.: Chapter 7 // C.M.: Chapter 5
Wk. 7	From Thinking to Action: The Lean Leap	L.T.: Chapter 8
Wk. 8	Midterm Exam (30%) // **REVIEW All material covered in weeks 1-7** **Due: Term Project Status Report -- Each group will give a brief presentation (10 minutes)**	
Wk. 9	Midterm Exam (30%) // **All material covered in weeks 1-7** // **Format: T/F, M.C., Essays** **L.T.: Chapters 1-8, C.M.: Chapters 1-5, the weekly lectures & CANVAS discussion threads.** **OPEN BOOK & OPEN NOTES**	
Wk. 10	Midterm Exam: Outcome & Review From Thinking to Action: The Lean Leap	L.T.: Chapter 9
Wk. 11	From Thinking to Action: The Lean Leap	L.T.: Chapters 10 & 11
Wk. 12	Lean Enterprise	L.T.: Chapters 12 & 13
Wk. 13	The Steady Advance of Lean Thinking	L.T.: Chapter 14
Wk. 14	Institutionalizing The Revolution	L.T.: Chapter 15
Wk. 15	**Term Project --- Group Showcase Presentations**	
Wk. 16	**Term Project --- Group Showcase Presentations /// Course Review & Wrap-Up**	
Wk. 17	FINAL EXAM (35%) // **COMPREHENSIVE** // **Format: T/F, M.C., Essays** **Both books (L.T. & C.M.) entirely, the weekly lectures & CANVAS discussion threads.** **OPEN BOOK & OPEN NOTES** **12-Dec-2023, 8:00 – 10:00 pm**	

***: Lean Thinking Textbook (L.T.) /// Cellular Manufacturing Handbook (C.M.)**

GENERAL COURSE STRUCTURE

There are three learning activity tracks that run concurrently throughout this course:
-The first track entails lecture presentations and discussions of topics pertaining to lean and cell manufacturing, systems engineering and management.
-The second track involves reading assignments, midterm and final exams (multiple-choice, true & false and write-up essays), and participation in the discussion threads posted on CANVAS.
-The third track is the team development of a lean manufacturing project. By the 3rd-4th week of the semester, the instructor will establish teams consisting of 4-6 members each, chosen randomly.

Note: Only the term project will be a team effort. All other course tasks and requirements (exams, assignments, etc.) are done solely on an individual basis. The manner in which this course is structured is such that active participation of all class members throughout the semester is essential.

COURSE EVALUATION / GRADE SCALE

(Refer to the last page of the syllabus for more information on grades)

(15 pts) – Attendance of the weekly lectures (**5%**) and **participation** in the discussion threads (**10%**) on CANVAS. The weekly discussions threads are locked in a 1-week period – If you miss it, you lose it. ***PLEASE DO NOT ASK FOR AN EXTENSION!!!***

(30 pts) – Midterm Exam -- Format: True/False, Multiple Choice & Essays.
L.T.: Chapters. 1-8, C.M.: Chapters 1-5, the weekly lectures & CANVAS discussions.

(20 pts) – **Group Term Project:**
PPT file and in-class presentation: 18 points
Self & Peer Evaluation Form (SPEF) - Mandatory: 2 points

You can download the form via the MSE507 webpage. It is also posted on CANVAS.
Important Note: By not submitting the SPEF, students will forfeit the +/- sign for the course grade.

(**35 pts**) Final Exam / **Comprehensive** - ALL material covered --- Both books (L.T. & C.M.) entirely, the weekly lectures & CANVAS discussions.
Format: True/False, Multiple Choice & Essays.

Letter-Grade Scale (*NO CURVING!*):
((Refer to the last page for more information on the grading criteria.))

A ≥ 92	**88 ≤ A- < 92**	**85 ≤ B+ < 88**
80 ≤ B < 85	**78 ≤ B- < 80**	**75 ≤ C+ < 78**
70 ≤ C < 75	**68 ≤ C- < 70**	**60 ≤ D < 68** **F < 60**

***** Course grades are due by 22-Dec-2023 *****

Note:

By the third-fourth week into the semester, groups consisting of 4-to-6 members will be formed on a random basis. Group research assignments will be given throughout the semester along with a final term project.
Class presentations should be expected.
Attend ALL lectures promptly --- Be motivated.

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GROUP TERM PROJECT GUIDELINES:

- Groups of 4-6 members will be chosen randomly by the instructor.

- Topics for the group term project will be assigned by the instructor. The term project is worth **20%** of the course overall grade.

- All class members **must** participate in the research task & in-class presentation.

- The **mandatory** "Self & Peer Evaluation Form" (posted on CANVAS and the course website) is due on the announced day of the in-class presentations. Submitting the form is 100% required by all class members. The form should be "**typed**" and **not** hand-written or scanned. Students will individually and confidentially submit the form in **PDF** via a special link made available in the course module on CANVAS.

- The professionally-done PPT file (one upload per group leader!) is due on the announced day of the in-class presentations. A complete write-up report is **not** required. Each group leader/facilitator shall upload the PPT file via s special link to be made available in the course module on CANVAS. **The PPT** must contain **30-33** slides (excluding the cover page, appendix and references page) an and should be done professionally. **The presentation must be informative, creative, rich, insightful and reader-friendly.** Each group will have 20-25 minutes to present their case, followed by a 15-minute question & answers session. The presentation should be comprehensive covering **all** aspects of the assigned topic/project. Follow the "Oral Presentations Rubric" that is posted on the course webpage and on CANVAS. Submissions that do not conform to the above format will not be accepted.

It is a fundamental principle of academic integrity that the authorship of the intellectual content of works submitted as part of a class assignment must be fairly represented. Contributions of language and thought must be appropriately credited.

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Academic Dishonesty:

Academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form at California State University Northridge. All students involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension and/or expulsion from the University.

"Cheating or plagiarism in connection with an academic program at a CSU campus is listed in Section 41301, Title 5, California Code of Regulations as an offense for which a student may be expelled, suspended or given a less severe disciplinary sanction.

Academic dishonesty is an especially serious offense and diminishes the quality of scholarship and defrauds those who depend on the integrity of the University's programs." Please consult university policy regarding plagiarism and the consequences.

https://catalog.csun.edu/policies/academic-dishonesty/

Any student caught cheating or plagiarizing in this class will receive a zero for the assignment and may be referred to the dean's office for additional consequences.

Academic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person. The instructor reserves the right to submit your papers to turnitin.com for identifying papers containing unoriginal material.

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For Your Information: Grade Evaluation Criterion

* A grade range of A to A- is reserved for work that is exceptional. This means that it (1) is professional and reflects the writer's/s' careful consideration of audience and purpose; (2) shows perfect to near-perfect understanding of the necessary concepts and analytical tasks; (3) where appropriate, it shows the capacity to think creatively or to see implications beyond the immediate scope of the question; (4) contains all necessary information (invention); (5) is arranged in a logical manner (6), is memorable; (7) delivery is visually appealing; and (8) is free of mechanical errors and is formatted as specified. Work must be flawless to attain an A/A-. Work with minor flaws that is nonetheless excellent in other ways will earn an A-.

* A grade in the B range means that the work is acceptable at the graduate level (B- range) to very good (B/B+). This work satisfies all (B+) or most (B/B-) of the requirements of the question & research tasks, shows the capability to think beyond the task by relating it to other areas of knowledge in or outside of the course; is neatly presented and shows above-average use of academic English. If the work is decently written, is formatted basically correctly, and covers most of the required content, but has several minor flaws or one major flaw, the grade is B-.

* A grade in the C range means that the work, while covering much of the required ground, does not show graduate-level analytic and expressive ability. That is, major and minor items may be missing or incorrect; and while the language may communicate most points adequately, it does not qualify as above-average academic work.

* A grade in the D range shows that the work does not, overall, achieve an acceptable level of coverage of the requirements AND/OR the language is insufficient to make the writer's points understandable to the reader. The content may be either incorrect to an unacceptable degree, or very incomplete.

* A grade of F indicates that so little of the required content is covered that grading the paper is an exercise in futility. It may mean that very major points have clearly not been grasped or have been misunderstood by the student. An F may also indicate that the ideas are expressed in such a way that they are not at all understandable to the reader. A grade of F is also awarded when assigned work is not handed in, or not handed in by the set deadline.

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