

Syllabus Lean Manufacturing IT-465

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COURSE CONTENT: This course will cover the principles and techniques of lean manufacturing. Major topics covered include lean principles, 5S, value stream mapping, total productive maintenance, manufacturing/office cells, setup reduction/quick changeover, pull system/Kanbans, continuous improvement/Kaizen, lean six sigma, lean simulation, and other modern lean manufacturing techniques and issues.

TEXTBOOKS:

- Lean Thinking: Banish Waste and Create Wealth in Your Corporation, Revised and Updated, Second Edition, by James P. Womack and Daniel T. Jones, Free Press, 2003.
- Implementing World Class Manufacturing (Includes Lean Enterprise), Second Edition, by Larry Rubrich and Madelyn Watson, Wcm Associates, 2004.
- The Lean Pocket Guide, by Donald M. Tapping, MCS Media, Inc., 2003.

EVALUATION OF STUDENT PERFORMANCE:

<u>Test #</u>	<u>Chapters Covered</u>	<u>Points</u>	<u>Percentage</u>	<u>Grade Std.</u>
Exam 1	Intro, Ch's 1, 2, & 4	100	20%	90-100% - A
Exam 2	Ch's 5, 6, & 7	100	20%	80 - 89% - B
Exam 3	Ch's 8, 9, & 10	100	20%	70 – 79% - C
Quizzes		60	12%	60 – 69% - D
Homework		60	12%	<60% - F
Lean Paper		50	10%	
Class Participation and Attendance		30	6%	
	Total	500	100%	

EQUIPMENT: A hand-held scientific calculator.

The instructor reserves the right to modify the contents of this syllabus. Students will be notified of changes to the syllabus in a timely manner. Other requirements may be added during the class meetings

GRADING POLICY: No late homework will be accepted and missed exams have a 20% penalty unless an appropriate, prior excuse is given to the instructor. The missed exam must be completed on the make-up date set by the instructor.

Attendance is required. All absences must be pre-approved by the instructor.

ACADEMIC CONDUCT: Cheating on examinations, submitting work of other students as your own, or plagiarism in any form will result in penalties ranging from an **F** on the assignment to expulsion from the university, depending on the seriousness of the offense.

MAJOR TOPICS:

Week #1

- Introduction
 - Video “Introduction to Lean Manufacturing”
 - Prominent Figures
 - Value Add & Waste
 - Waste Walks & Spaghetti Diagrams
 - Poka-Yoke/Mistake Proofing
 - Video “Mistake Proofing”
 - Hoshin Planning
 - Lean Assessment/Organizational Assessment
- Lean Principles
- Why Implement Lean (Ch. 1)
- Barriers to Implementation (Ch. 2)
- Tuning the Implementation (Ch. 3)
- 5S (Ch. 4)
 - Video “5-S”

Week #2

- Value Stream Mapping (VSM) (Ch. 5)
 - Video “VSM”
 - Video “Visual Control”
- Total Productive Maintenance (TPM) (Ch. 6)
- Cellular Manufacturing/Quick Response Manufacturing (Ch. 7)

Week #3

- Setup Reduction/Quick Changeover (Ch. 8)
 - Video “Quick Changeover”
- Kanbans/Pull Systems (Ch. 9)
 - Video “Kanbans”
- Kaizen/Continuous Improvement (Ch. 10)

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LEAN PAPER:**Article Review: (Discussed by Instructor 1st Weekend)****Due: November 3, 2007 (can be submitted early)**

Students are asked to review a current article relating to lean manufacturing or Toyota production system. The purpose of this assignment is for students to have an opportunity in evaluating the content and quality of an article. Students will be graded on how well the following points are addressed:

- Describe the problem or issue covered by the article
- Summarize the problem's background
- Discuss the major points of the article
- Present your conclusion and synopsis of the article, which at a minimum includes:
 - What is the impact of the suggestions given in the article?
 - In your opinion, will the suggestions have value in industry?
- Rate the article: Good/Fair/Poor (support your rating)

Other requirements

- No anonymous authors
- No articles dated 2002 and before
- Submit original article with the review
- Cover Page will include:
 - Title of Article Reviewed
 - Course
 - Instructor
 - Your Name
 - Date
- Format of paper
 - Typed – 12 pt – 1.5 line spacing – 1” margins
 - Number and place name on each page after title page
 - Your summaries are limited to 3 pages excluding title page
 - Summaries will be graded for grammar, spelling, punctuation, etc.

Other Grading Criteria

- Quality of source and article (e.g. peer reviewed article, professional journal, trade magazine, internet article)
- Readability (e.g. flow, logical)

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Homework:**Assignment: Duration of the Course: (Quiz #6)**

From “Lean Thinking” read chapters 1-5

Week 1:

- Explain the importance of implementing lean manufacturing.
- Describe the five key principles that guide lean thinking.
- Describe the eight general types of waste.
- Explain the differences between type one muda and type two muda.
- Describe customer satisfaction. Explain how can higher customer satisfaction lead to lower costs.
- Describe 5S and its implementation steps.
- Describe 5 Whys.
- Explain the differences between value-added and non-value-added work.
- Describe Poka-Yoke.

Week 2:

- Describe Value Stream Mapping and demonstrate how to carryout this process.
- Describe and compute Takt time (Handout).
- Describe Total Productive Maintenance and its implementation steps.
- Compute Equipment Availability, Equipment Quality Performance, and Equipment Efficiency Performance.
- Describe various maintenance strategies (reactive maintenance, preventative maintenance, predictive maintenance, corrective maintenance, and maintenance prevention).
- Describe Autonomous Maintenance.
- Describe Manufacturing/Office Cells and the implementation steps.
- Describe the benefits of Manufacturing Cells.

Week 3:

- Describe Setup Reduction and its implementation steps.
- Explain how Setup Reduction reduces inventory.
- Explain how Setup Reduction improves quality.
- Explain the differences between internal setup and external setup.
- Describe Inventory Kanbans and the implementation steps.
- Explain the differences between Withdrawal Kanban, Production Kanban, and Signal Kanban.
- Explain how Kanbans reduce waste.
- Describe Kaizen and its implementation steps.

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