



**DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING  
INDUSTRIAL ENGINEERING PROGRAM, BSC.**

**Course Syllabus**

**1. Course number and name**

IE 572 Lean Production Systems

**2. Credits and contact hours**

(3+0) 3 credit hours, 3 contact hours

**3. Course type**

Blended Learning Course (2+1)

**4. Instructor's or course coordinator's name**

Dr. Nader Santarisi

**5. Textbook information**

Sanjay Bhasin (2015), Lean Management Beyond Manufacturing, Springer, ISBN 978-3-319-17410-5.

**a. Other supplemental materials**

1. Instructor's notes.
2. Jeffrey K. Liker (2021), The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer, 2nd Edition, McGraw-Hill, ISBN: 9781260468526
3. Marc Helmold (2020), Lean Management and Kaizen: Fundamentals from Cases and Examples in Operations and Supply Chain Management, Springer, ISBN 978-3-030-46981-8
4. David Mann (2015), Creating a Lean Culture: Tools to Sustain Lean Conversions, 3rd Edition, Productivity Press, ISBN: 9780429256486
5. Pascal Dennis, (2015), Lean Production Simplified: A Plain-Language Guide to the World's Most Powerful Production System, 3rd Edition, Taylor & Francis Group, ISBN 13: 978-1-4987-0888-3
6. Chris Harris and Rick Harris (2014), Capitalizing on lean production systems to win new business: creating a lean and profitable new product portfolio, Taylor & Francis Group, ISBN 13: 978-1-4665-8633-8
7. James P. Womack and Daniel T. Jones (2003), Lean Thinking: Banish Waste and Create Wealth in Your Corporation, 2nd Edition, Free Press, ISBN13: 978-0743249270



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8. Ronald G. Askin and Jeffrey B. Goldberg. (2002), Design and Analysis of Lean Production Systems, 1st Edition, John Wiley & Sons, Inc., ISBN: 978-0-471-11593-9
9. Related Textbooks and websites.

### 6. Specific course information

#### a. Catalog description

Basic lean principles and tools/ techniques such as Value Stream Mapping (VSM), Just in Time (JIT) and Kanban, 5S- process, Quick changeover, Zero defect quality control, Set up time reduction, continuous improvement (kaizen).

#### b. Prerequisites or co-requisites

Prerequisite: IE 565 Industrial Facility Planning

#### c. The course is:

Required in Industrial Engineering program.

### 7. Specific goals for the course

#### a. Course outcomes:

After completion of the course, students are expected to be able to:

1. Identify the non-added value activities.
2. Apply the standard lean operations' tools such as value steam mapping (VSM), 5S, visual workplace and visual order control, manufacturing cells, setup time reduction, quality at source, and total productive maintenance and OEE.
3. Understand the benefits of incorporating lean concepts during the development phase of new products.

#### b. The following student outcomes are addressed by the course:

SO-(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

SO-(d) an ability to function on multidisciplinary teams

SO-(e) an ability to identify, formulate, and solve engineering problems

SO-(Criterion 9: Program Criteria) ability to design, develop, implement, and improve integrated systems that include people, materials, information, equipment and energy using appropriate analytical, computational, and experimental practices.



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**8. Learning Outcomes and their Alignment with Program Educational Objective (PEO's), Methods of Delivery, and Assessment Methods:**

Learning Outcomes	Program PEOs	Method of Delivery	Assessment Method
<b>Course Outcomes</b>			
CO-(1): Identify the non-added value activities.	-	Lectures (Example and Problems)	Assignment/ Quiz
CO-(2): Apply the standard lean operations' tools such as value stream mapping (VSM), 5S, visual workplace and visual order control, manufacturing cells, setup time reduction, quality at source, and total productive maintenance and OEE.	-	Lectures (Example and Problems)	Assignment/ Quiz/Project
CO-(3): Understand the benefits of incorporating lean concepts during the development phase of new products.	-	Lectures (Example and Problems)	Assignment/ Quiz/Project
<b>Student Outcomes</b>			
SO-(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	1-3	Term Project	Term Project
SO-(d) an ability to function on multidisciplinary teams	1-3	Term Project	Term Project
SO-(e) an ability to identify, formulate, and solve engineering problems	1-3	Lectures (Example and Problems)	Midterm Exam
SO-(Criterion 9: Program Criteria) ability to design, develop, implement, and improve integrated systems that include people, materials, information, equipment and energy using appropriate analytical, computational, and experimental practices.	1-3	Term Project	Term Project



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**9. Weekly Teaching Plan**

Lecture(s)	Topic	Method of Delivery
1-3	Introduction Lean Thinking & Wastes	Lecture/ Online Lecture
4-10	Kaizen & 5S system	Lecture/ Online Lecture
11-15	Visual Factory	Lecture/ Online Lecture
16-22	Value Stream Mapping VSM	Lecture/ Online Lecture
23-30	Kanban (JIT) Systems	Lecture/ Online Lecture
31-35	Quick Changeover - SMED	Lecture/ Online Lecture
36-40	Poka-Yoke: Quality at Source	Lecture/ Online Lecture
41-45	Total Productive Maintenance & OEE	Lecture/ Online Lecture

**10. Grade Distribution:**

Assessment	Grade	Week No.
- Midterm Exam	30%	7 <sup>th</sup> Week
- Assignments (Reports /Project/Quizzes/ Home works ...)	20%	1-16 <sup>th</sup> Week
- Final Examination	50%	16 <sup>th</sup> Week

Note: Make-up exams will be offered for valid reasons. It may be different from regular exams in content and format.