Emgt 6611: Lean Systems

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Syllabus
The course is an introduction to the principles of Lean. The discussion will be focused on implementing the Lean philosophy and the various associated methodologies. Lean manufacturing is a total enterprise philosophy built upon increasing the synergy between humans and technological systems. Use of various tools such as value streams, flow, just-in-time, autonomation, TAKT time, inventory turns, standardized work, kanban, pull system, quick changeover, workplace organization, and visual controls are covered to improve system performance.

Prerequisites: Graduate Standing
Course Objectives (II)

- Introduce fundamentals of lean concept
- Identify supporting structure required to ensure success in lean transformation
- The focus of this course is to identify and remove waste ("muda") in its various forms in a system.
- Identify opportunities to apply lean concepts to a system or organization, for example in manufacturing and non-manufacturing areas such as design, service, new product development, etc…
Course Objectives (III)

• The benefits at the successful completion of this course include:
  – A firm understanding of the lean manufacturing philosophy and concepts.
  – Application of value stream mapping technique to create current and future state maps.
  – Understanding of three key elements that ensure the success in lean transformation.
  – Familiar with lean tools
Course Topics

• Topics to be considered include:
  – Lean operating system
  – Lean infrastructure
  – Mentality, attitude and behavior
  – Value stream mapping
  – Diagram techniques
  – Standard work, TAKT time
  – Leveled production
  – Kanban and visual management
  – 5S
  – TPM
  – SMED
  – Poka-Yoke
  – Lean NPD
  – VOC
  – Decision flow
  – AHP
  – TRIZ
  – Prototyping
  – DFM and robust design
  – Other related topics e.g. Industry 4.0 and Lean
Grading

Grades will be calculated in the following way:

• In-class test – Final Exam 30%
• Semester Project (team project)
  – Project topic/background 5%
  – Mid-term project 30%
    • Oral presentation and report
• Final project (team project)
  • Oral presentation and report 35%
## Grading

<table>
<thead>
<tr>
<th>Final grade for undergraduate students:</th>
<th>$A \geq 90$, $80 \leq B &lt; 90$, $70 \leq C &lt; 80$, $60 \leq D &lt; 70$, $F &lt; 60$</th>
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<tr>
<td>Final grade for graduate students:</td>
<td>$A \geq 90$, $80 \leq B &lt; 90$, $70 \leq C &lt; 80$, $F &lt; 70$</td>
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Schedule

• Project kick-off presentation: 3rd or 4th week
• Mid-term project presentation: 8th week
• Final project presentation: 15th week
• Final exam:
Test

• One Exam
  – Open book and open notes including internet search
  – Location: location of your choice except classroom

• The test will be given between 7:00 -10:00 pm. Email answer sheet to me by 10:00 pm. File name must include your last name. File format: .pptx, .doc, .pdf, .jpg.

• No makeup test will be allowed
Semester Project

• Each student will apply the lean concepts to a project.

• Students will give oral presentations, and submit a written report on their project. Acceptable format of report: .docx, pptx or .pdf

• Project team: Each team consists of x members. Contact me if you have difficulty to find team member.
Project Kick-off Presentation

- Content requirements:
  - Team formation
  - Select project topic (process such as assembly of simple product like ball point pen, bookstore store operation, pizza preparation, manufacturing lab operation, billing process, inventory control)
  - Background information: Description of the product and process

- Presentation
  - Each team (one presenter only) has 5 min to make presentation,
  - Email me team report (any of the following formats: pptx, pdf. doc., xls)
Midterm Project Report & Presentation

• Content requirements:
  – Value stream mapping of the production, service or design process (current state)
  – Identify waste in the process
  – Select problem/opportunity to tackle
  – Reasons and/or justification for tackling the problem
  – Scope and boundary
  – Goals
  – Define measurable index (for assessing project success or failure)

• Presentation
  – Each team (all members) has 20 min to make presentation,
  – Email me team report (any of the following formats: pptx, pdf, doc., xls)
Final Project Report & Presentation

• Improve your mid-term project report (e.g. use SMART goals, quantitative metrics, problem statement)
• Create future state Value Stream Map (VSM)
• Select one or two problems (or wastes) to tackle
• Perform Gap Analysis and construct Hypothesis for solution
  – List of alternative and describe lean tools used to drive solution
  – Design rapid experiment
  – Plan (who, what, when, where, how, budget)
  – Results or anticipated results
  – Insight and/or reflection
• Presentation
  – Each team (all members) has 20 min to make presentation,
  – Email me team report (any of the following formats: pptx, pdf, doc., xls)
**Course Text**

**Required textbook:**

**Optional Texts:**
Course Resources

• All course material is posted on Canvas
• Canvas will contain:
  – Announcements
  – Class lecture material
  – Grades
Contact Information

– linho@mst.edu
– Missouri S&T Global – St Louis Phone: (314) 835-9822
– Missouri S&T Global – St Louis Fax: (314) 835-9815
– EdTech email: vcchelp@mst.edu
– EdTech Phone: (573) 341-4526

• Course Information (Lecture slides)
  – Canvas /FILE