Lawrence Technological University
A. Leon Linton Department of Mechanical Engineering
Master of Science in Industrial Engineering (MSIE)
EME 6673 – Six Sigma Processes
Summer 2012

Course Information:
Course No.: EME 6673
Course Title: Six Sigma Processes
Lecture: Thursday, 5:30 pm – 9:15 pm
Classroom: E203
Office hours: Tuesday and Friday, 3:00 – 5:00 pm or by appointment
Internet site: Blackboard my.ltu.edu

Faculty Information:
Ahad Ali, Ph.D., Assistant Professor and Director of MSIE Program
Tel: 248 204 2531, Fax: 248 204 2576, Office: E37
Email: aali@ltu.edu; Web page: http://qbx6.ltu.edu/aali/

Catalog Description:
The course will cover modern design tools and methods on the Six Sigma paradigm. Topics include tools and methods including process flow diagrams, cause and effect diagrams, gage R&R, organizational leadership, product development, system integration, critical parameter management, quality function deployment, concept generation, and strategy for organizing six sigma techniques in industry among many others. Provide useful tools to conceive new product requirements, design baseline functional performance, optimize design performance, and verify system capability. Project based learning will be used.

References:
Cavanagh, R. R., Neuman, R. P. and Pande, P. S., The Six Sigma Way: How GE, Motorola and Other Top Companies are Honing Their Performance.

Objectives:
By the end of this course, you should be able to:
1. understand and describe the six sigma processes for continuous improvement
2. describe, select and use the DMAIC approach
3. explain and apply six sigma quality tools
4. establish six sigma baseline metrics and perform process improvement
5. comprehend quality function deployment
6. conduct a gauge R&R and do a process capability analysis
7. make effective product and process decisions using six sigma methodologies
8. demonstrate relevant computing technologies applications

Six Sigma Topics
- Introduction to Six Sigma & DMAIC
- Six Sigma Body of Knowledge: Define, Measure, Analyze, Improve, and Control (DMAIC)
- Describe, Idea Generation, select and use the DMAIC approach
- Apply Six Sigma quality tools
- Comprehend and apply Six Sigma measurement techniques
- 6σ SPC, Attributes Control Charts, Variables Control Charts
- Quality Function Deployment (QFD)
- Confidence Level and Hypothesis Tests
- Process Capability
- 6σ – Chi-Square Analysis
- 6σ – Benchmarking
- Gage R&R Analysis
- Visualization of Data

SIX SIGMA PROJECT

Six Sigma Project Selection and Planning
- Outline of Project Expectations/Entitlement
- Project Selection
- Determination of Project Scope
- Development of Project Charter
- Development of Project Business Case
- Team Selection and Development

Project Performance
- Baseline Current Process Performance
- Evaluate and Select Project Methodologies
- Establish Six Sigma Baseline Metrics
- Validate Measuring System
• Collect Data
• Analyze Data
• Perform Process Improvement Experiments
• Implement Improved Process

**Project Completion and Presentation**
• Determine Six Sigma Control Methodologies
• Implement Methodologies
• Measure Process Performance and Determine Project Financial Benefits
• Develop Written Project Report
• Develop Presentation
• Make Presentation

**Grading Policy:**
Homework 30%, Case Study Presentations 10%, Midterm 30%, Project 30%

A 90, A- 87, B+ 84, B 81, B- 78, C+ 75, C 72, C- 69, D+ 66, D 63, D- 60, F < 60

**Course Outlines:**

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<td>Introduction to Six Sigma &amp; DMAIC</td>
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<td>20</td>
<td>Six Sigma Body of Knowledge: Define, Measure, Analyze, Improve, and Control (DMAIC)</td>
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<td>2</td>
<td>Describe, Idea Generation, select and use the DMAIC approach</td>
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<td>6σ SPC, Attributes Control Charts, Variables Control Charts</td>
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<td>Process Capability, 6σ – Chi-Square Analysis, 6σ – Benchmarking</td>
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Six Sigma Related Resources:

- 12th Annual Lean Six Sigma & Process Improvement Summit, 2011
- IEEE Reliability Society http://www.ieee.org/portal/site/relsoc
- Institute of Industrial Engineers, Six Sigma, Quality and Reliability, http://www.iienet.org/
- International Journal of Lean Six Sigma
- International Journal of Quality & Reliability Management, Emerald
- International Journal of Quality, Statistics, and Reliability
- International Journal of Six Sigma and Competitive Advantage
- International Society of Six Sigma Professionals (ISSSP), http://www.isssp.com/
- National Science Foundation (NSF) Industry University Cooperative Research Center for Quality and Reliability Engineering, Rutgers University and Arizona State University, http://coewww.rutgers.edu/~ie/qre/about.html
- Quality & Productivity Journal
- Some real-world applications http://www.amazon.com/World-Class-Applications-Six-Sigma/dp/0750664592
- www.isixsigma.com