ENME466
Lean Six Sigma Strategy & Methods:
Breakthrough Improvement and the DMAIC Process

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Prerequisites:
Statistics course or working knowledge of basic statistics or instructor permission.

Objectives of the Course: This course intends to provide in-depth understanding of Lean Six Sigma and its Define – Measure – Analyze – Improve – Control (DMAIC) Breakthrough Improvement Strategy. Emphasis is placed on the DMAIC process which is reinforced via application of semester long DMAIC projects and case study analysis.

Texts & Other Course Materials

● The Lean Six Sigma Pocket Toolbook: A Quick Reference Guide to 100 Tools for Improving Quality and Speed
  by Michael L. George, John Maxey, David Rowlands and Mark Price (Aug 1, 2004)
● Lean Sigma, I. Wedgwood, isbn 0-13-239078-7

Downloads & Useful Internet Links

Quality Function Deployment: at: http://www.mazur.net/publish.htm READ THE FOLLOWING:

● 9 House of Quality Checks;
● Elicit Service Customer Needs Using Software Engineering Tool;
● Jurassic QFD;
● Voice of Customer Analysis: A Modern System of Front-End QFD Tools;
● Improving Idea Development and Concept Optimization;
● Bagel Sales Double at Host Marriott (download the more complete version).


Class Approach to Learning & Teaching: In order to enhance the value of this course to its stakeholders, active participation from you is expected. Also the course relies on readings to establish key terminology and frameworks and timely review of readings pertaining to the associated lectures is expected. You are valued customers, though not the sole stakeholder, so that your satisfaction with the course is one key objective. You are invited to contact me about course matters at any time, in class or outside the classroom, formally or informally. I value meaningful dialogue with students and believe that it is important to assess their
satisfaction with the course and associated learning experience.

**Course Performance:** Emphasis is placed on development of a thorough understanding of Six Sigma’s DMAIC Breakthrough Improvement Strategy and its application. Evaluation of participant performance is based on two homework assignments, two competency examinations, and a required team project intended to provide experience with the DMAIC process.

**Project Orientation:** A primary motivation for requiring a project is that it provides an experience analogous to project requirements associated with Six Sigma Green Belt certification. The project is rigorously evaluated and project requirements include direct application of the Six Sigma Breakthrough Strategy and associated tools.

**Project Presentation / Paper Requirement(s):** Specific project paper format requirements will be supplied by the instructor. It is expected that the Measure Report will be a length of at least 2500 words, exclusive of graphics, tables and appendices. Final Reports (DMAIC) should leverage and build upon the Measure Report and it is expected that the Final Report will be a length of at least 5000 words, exclusive of graphics, tables and appendices. All papers are expected to be well written and thoroughly researched. Final Presentations must be of length 30-35 minutes, inclusive of questions. Written progress reports are to be emailed to the instructor/uploaded to Blackboard by 5PM on Mondays.

**Examination Orientation:** Jointly considered, two examinations are intended to rigorously and comprehensively probe knowledge that is targeted at a level between that expected of Six Sigma Green Belts and Six Sigma Black Belts. Resources that you will be allowed to have access to will mirror those permitted during certification exams administered by the American Society for Quality.

15% Midterm Examination 60% Project (see below for breakdown)
15% Final Examination
10% Homework Assignments

- 25% Client feedback and survey about project/team performance
- 25% Appropriate use of tools to justify conclusions
- 25% Student/team feedback and survey about project/team performance
- 25% Professionalism throughout project (client interaction, presentations, reports, etc...)
- +/- Observed team role and participation

*Note: Homework must be submitted by class time on the day it is due. A printed and electronic copy of Examinations must be submitted by 5PM on the day they are due.

*Note: All work must be shown on all homework assignments and exams. **No work = no credit, no exceptions.**

You are expected to function as a responsible team member and evaluations will – in part – address conformance of your performance to that to which you agreed in your team project charter. This includes class attendance and participation. Additionally, peer evaluations may result in differential grades for team members on Phase I and Phase II Reports and Presentations.

**Green Belt Certification:** Through completing this course, everybody has the potential for earning a Green Belt certification. Certifications will be given pending satisfactory completion of the following requirements.

75% of Certification Consideration
- 85%+ Average Exam Grade
- 85%+ Average Homework Grade
- 85%+ Personal Project Score
- 85%+ Team Project Score

25% of Certification Consideration
- Professor/TF Evaluation
- Mastery of Six Sigma skills
- Ability to apply material
- Understanding content outside of project
- Proactive team participation

**Academic Integrity Code:**

The Code of Academic Integrity found in the 2015-16 Undergraduate Catalog will be upheld. A synopsis of the University's Policy on Academic Dishonesty can be found online. All work turned in by a student must be the student's own work. One example of academic dishonesty is copying the examination problem solutions of another student. When it appears that Code has been violated, standard university measures will be taken.

“The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please

ON EACH EXAM OR ASSIGNMENT you will be asked to write out and sign the following pledge. "I pledge on my honor that I have not given or received any unauthorized assistance on this exam/assignment."

**Cell Phone and Laptop Policy:** The use of cellphones and laptops is not permitted during class.

**Special Needs:** Any student with special needs should bring this to the attention of the instructor as soon as possible, but not later than the second week of class.

**Schedule:**

**Week 1: 1/26 & 1/28**
Intro to Lean Six Sigma Course; Ice Breakers. Intro to DMAIC and Lean. Overview of Projects. Team Placement Survey.
Intro to DMAIC and Lean (cont). Intro to Professionalism.

**Week 2: 2/2 & 2/4**
Intro to Define Phase. Basic Professionalism.

**HWK 1 Assigned.**

**Week 3: 2/9 & 2/11**
Intro to Lean Principles by Jeffrey Herrmann.
TQM Lecture by Teaching Fellows
Teams formed
Intro to Define Report
HWK 1 Due (2/11)

**Week 4: 2/16 & 2/18**
Progress Reports. Project Charter. Intro to Measure. Process Maps

Root Cause. 5 Whys. Cause and Effect. **Project Charter and Gantt Chart Due (2/18).**
Every team has completed a site visit (talk to Dr. Bigio if problems)

**Week 5: 2/23 & 2/25**
Lean Tools
Lean Scenarios. **Process Map Due (2/25).**

**Week 6: 3/1 & 3/3**
Measurement systems. R&R. **Exam 1 Assigned**
Week 7: 3/8 & 3/10

Introduction to Analyze
Team Coaching. Schedule TF Debrief

Week 8: 3/22 & 3/24

Lean Qualification. Regression. Hypothesis Testing. Chi Squared. ANOVA (as needed)

Measure Report Due (3/24).

Week 9: 3/29 & 3/31

Analyze tools. Intro to Improve Phase. Change Management.
DOE. Team time to brief.

Week 10: 4/5 & 4/7

HW 2 Assigned. DOE continued
Improvements and Justifications

Week 11: 4/12 & 4/14

Intro to Control Phase
TBD. HW 2 Due (4/14).

Week 12: 4/19 & 4/21

SPC and TBD
TBD

Week 13: 4/26 & 4/28

DMAIC Recap
Discuss presentations

Week 14: 5/3 & 5/5

TBD
In-class presentations. Assign Final Exam.

Week 15: 5/10 & 5/12

In-class presentations
Final Report Due (TBD).
Week 16: 5/12 – 5/18

Final Exam Due (TBD).