

BSTA 531: Lean Six Sigma I
Department of Public Health & Preventive Medicine
Oregon Health & Sciences University
Fall Term, 2011

COURSE DESCRIPTION: A high-performing organization is one that understands how to improve. Continuous improvement in customer satisfaction and profitability is accelerated by applying the philosophies and methodologies of structured process improvement. This course will focus on the particular form of performance improvement known in the business community as “Lean Six Sigma.” In recent years many of U.S. industry’s most well-known companies, government agencies, and an increasing number of healthcare organizations, have implemented organization-wide Lean Six Sigma initiatives that have returned significant financial and customer satisfaction benefits. Professionals and managers in the broad field of health care delivery need to be aware of and skilled in the essential elements of this methodology in order to achieve significant improvement in patient care as well as the bottom line. As such, a central element of this course will be the completion of a performance improvement project by teams of students in an actual client organization.

This course is the first in a two-part series, which includes the follow-up course, BSTA 532, offered during the 2012 Winter term. Students should plan to take both courses to obtain the full benefit of each course.

Our program is committed to all students achieving their potential. If you have a disability or think you may have a disability (including but not limited to physical, hearing, vision, psychological and learning disabilities), which may require accommodation, please contact the Coordinator for Student Access, Sue Orchard, at 503-494-0082 to discuss your request. All information regarding a student’s disability is kept in accordance with relevant state and federal laws. <http://www.ohsu.edu/academic/acad/osahome.html>

PREREQUISITES: None. An undergraduate introductory statistics course or the equivalent is recommended.

INSTRUCTOR: Donald K. Lewis, Ph.D. (Adjunct Associate Professor, Biostatistics)
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TIME/PLACE: Thursday 5:30-8:20, Campus Services Building, CSB 679

Periodically, the meeting day and/or time of a particular class session may be re-scheduled, due to work commitments of the instructor. Such changes will be made well in advance of the new day/time and only after conferring with members of the class to identify the suitable day/time substitute.

ADVISING HOURS: The instructor will provide same-day responses to general questions and concerns during most of the course period. Students are strongly encouraged to schedule phone conference calls or appointments before and after class to address more in-depth issues.

REQUIRED TEXTS:

Bisgaard, S. (2009). *Solutions to the Healthcare Quality Crisis*, ASQ Quality Press, Milwaukee, WI.

Graban, M. (2009). *Lean Hospitals: Improving Quality, Patient Safety, and Employee Satisfaction*, Taylor & Francis Group, New York, NY.

George, M., et al. (2004). *The Lean Six Sigma Pocket Toolbook*, McGraw-Hill, New York, NY.

REQUIRED SOFTWARE:

The statistical software system *Minitab 16* will be the computational platform for this course, and students should obtain a license during the initial week of the course. Minitab, Inc. provides attractive options for academic licenses of its current version (see <http://www.minitab.com/en-US/academic/licensing-options.aspx>). If a student has access to another comparable statistical package and would prefer using it, it may be substituted with the instructor's permission.

CLASS MATERIALS: Lecture notes and other class materials will be placed on Sakai.

GENERAL COURSE OBJECTIVES: The general objective of this course is to help the student become equipped to successfully lead a project team through the execution of a basic structured process improvement project that might be pursued in a hospital, clinic, health research institution, or similar organization. General student objectives include the following.

Upon successful completion of the course you should be able to:

1. Describe the essential concepts and philosophical roots of the Lean and Six Sigma approaches to performance improvement.
2. Identify the critical elements that must be present in any organization for structured process improvement efforts to flourish, including roles and responsibilities of key participants.
3. Select and scope a process improvement project, such that the project is linked to higher level organizational goals, has an acceptable return on investment, and low risk of failure.
4. Establish a set of measures to motivate the selection of and ultimate benefit derived from a performance improvement project in a healthcare setting.
5. Estimate the annualized financial return of such a project, using "cost of poor quality" methods.
6. Navigate a project team through the task-oriented roadmap for project completion, known as "Define-Measure-Analyze-Improve-Control" (DMAIC).
7. Understand the key principles of the "Lean Enterprise" and how they apply to healthcare improvement. Utilize the Lean metrics of cycle time, lead time, WIP, and takt time.
8. Evaluate and select a set of alternative metrics for establishing process "health." Establish operational definitions for process measures and provide assurance of measurement system "capability."
9. Understand the key statistical principles of process "control" and "capability" and how they are assessed using basic statistical process control tools.
10. Document an existing process using process mapping techniques, including value stream mapping.

11. Design, conduct, and analyze, using basic graphical and statistical techniques, a “process performance study” in order to:
 - a. assess the stability and capability of the process
 - b. identify key process inputs potentially causing process output variation.
12. Organize and present oral and written reports summarizing the interim results of your project.

CLASS FORMAT/STUDENT PARTICIPATION: This course utilizes a lecture-discussion format. Each week there will be a formal presentation by the instructor or guest lecturer, during which students are expected to question, challenge, or clarify the material as it is being presented, and to discuss issues/questions raised by your colleagues and/or the instructor. You are expected to have read the assigned material prior to its coverage and discussion in class. There will be weekly homework assignments that will be turned in and graded by the instructor.

You will carry out a client-based project, and this will serve as a basis for class discussion as well. (See below regarding the project.)

ATTENDANCE: Students are expected to attend and participate in all class sessions. Please notify the instructor by e-mail if you anticipate an absence.

PROJECT: The performance improvement project is designed to motivate the integration and application of the major concepts and methods of this course. The project’s completion is not expected until the end of the BSTA 532 class taught during the Winter 2012 term. However, both a written progress report of the project and an oral presentation by the project team at the end of this course is expected. The instructor will provide a handout that fully details the project assignment.

EXAMINATION: There will be one take-home exam. This exam is to be completed individually. The questions will be designed to assess how well you have mastered and integrated the material presented in the lectures, texts, readings, homework, and project deliverables.

METHODS OF EVALUATION:

Class Participation	15%
Homework / Quizzes	15%
Project	35%
Take-home Exam	35%

The following scale will be used in grading work and in the assignment of the final letter grade:

A	93-100
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D	Below 70

Course Schedule

Week	Topics	Readings / Assignments
1	Course Overview; The Need for Performance Improvement; The "Lean Six Sigma" strategy for performance improvement; DMAIC Roadmap	TBD
2	Process Improvement Projects: Selecting & Aligning Project Roles & Responsibilities; Key Stakeholders DEFINE Phase Overview & Project Metrics	TBD
3	MEASURE Phase Overview Common Lean Six Sigma Metrics Process Mapping	TBD
4	The "Lean Enterprise": Key Principles Common Lean Tools Value Stream Mapping	TBD
5	Measurement Assurance; Operational Definitions The Basic Measurement Systems Analysis Team Dynamics & Facilitation Overview	TBD
6	Setting the Process Baseline: Stability & Capability Basic Control Charts	TBD
7	Planning Performance Studies Cause & Effect Analysis Basic Sampling & Sample Size	TBD
8	ANALYZE Phase Tools: Overview Root Cause Analysis Methods Five Why's & Logic / Decision Trees	TBD
9	Exploring the Data for Association Correlation & Regression Multi-factor Graphs	TBD
10	Statistical Comparisons: Graphical Methods Two-sample Tests of Means, Proportions	TBD
11	Project Presentations	Take-home Final Due the following week