

**Design For Six Sigma**  
**IE 431 – A/AO/ONL**

**Instructor:** Harrison Kim, Ph.D.  
**Classroom:** 403B2 Engineering Hall  
**Lectures:** MW 11:00 AM – 12:15 PM  
**Office:** Transportation Bldg. 315  
**Office Hours:** Via email  
**Phone/e-mail:** 217-265-9437 / hmkim@illinois.edu  
**Grader/TA:** TBA  
**Textbooks:** 1. *Lean Six Sigma and Minitab (Required)*  
Author: Quentin Brook  
Publisher: QSB Consulting  
Edition: Any edition  
ISBN: 0954681320 or 0954681363

2. *Rath & Strong's Pocket Guide to Advanced Six Sigma Tools*  
(Recommended)  
Publisher: McGraw-Hill  
Edition: Any edition  
ISBN: 0071434119

3. *Introduction to Engineering Statistics and Six Sigma: Statistical Quality Control and Design of Experiments and Systems (Optional)*  
Author: Theodore T. Allen  
Publisher: Springer  
ISBN-10: 1852339551

**Prerequisites:** Undergraduate courses in probability and statistics. (Senior or above.)

**Note:** This course will be also offered to on-line students in industry.

**Course Objectives:** At the end of the semester, students will acquire the ability to apply the concepts and methods of statistical process control, designed experiments, and measurement systems analysis to the realistic cases of quality and productivity improvement.

**Software:** Minitab Statistical Software and a spreadsheet program such as Microsoft Excel will be needed in this course. Visit <http://www.onthehub.com/minitab/> for information on ordering Minitab Statistical Software (\$29.99 per semester).

<b>Grading:</b>	Exam 1 (11 – 12:30 in class, Refer to Compass)	90
	Exam 2 (90 min during final exam week)	90
	Quizzes (5, 12 pts each, complete close to deadline)	60
	Attendance and participation	12
	Case Studies (4 total)	<u>160</u>
	TOTAL	412

**Case Studies:** Students will be given four realistic case study assignments throughout the semester. The final “report” for each case study must be submitted in a pdf or Word format and submitted electronically in compass. (On-campus students need to submit printout versions also.) No late submission will be accepted unless approved by the Emergence Dean or by physician’s notes.

**Course Outline (Refer to Compass Calendar):**

<b>Session</b>	<b>Topic</b>
	<b>Define</b>
1	Course Introduction – Six Sigma Overview
2	Define-Measure-Analyze-Improve-Control (DMAIC) Problem Solving Process
Tutorial 1	Minitab Tutorial I
	<b>Measure</b>
3	Six Sigma Measure Phase: Measuring the Current State of the Process
4 - 6	Basic Quality Tools – Part I, II, III
7	Applying the DMAIC Six Sigma Problem Solving Strategy
	<b>Analyze</b>
8	Process Mapping and Value Stream Mapping
9	Cause and Effect Matrices
10	Failure Mode Effect Analysis
11	Simple Regression & Single Factor Experiments
Tutorial 2	Minitab Tutorial II
12-13	Measurement System Analysis – Part I
Review 1	Midterm Exam Review
14-15	Measurement System Analysis – Part II
16-17	Multiple, Stepwise, and Logistic Regression
	<b>Improve &amp; Control (Design &amp; Verification)</b>
18	Informal vs. Formal Optimization
19	Design for Quality and Service
20	Design Optimization for New Product and Service
21	Robust Design and Reliability
22-23	Design for Six Sigma (DFSS)
Review 2	Course Review & Final Exam Overview

Notes

- Students with disabilities are encouraged to contact Prof. Kim. Additional academic resources will be available through Disability Resources and Educational Services.
- Class notes will be available on compass website in pdf form. Bring your own copies to the class. Online students can find the pdf files under the “Lectures” link on the course website.