

SIX SIGMA BLACK BELT II

QEM 525



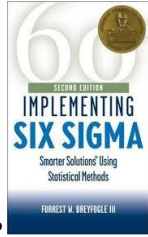
INSTRUCTOR: Dr. Tomas Velasco, C.Q.E., C.S.S.B.B.
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Carbondale, IL 62901-6603
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TEXTBOOK:

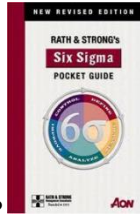


DESIGN AND ANALYSIS OF EXPERIMENTS, *Douglas C. Montgomery*, John Wiley & Sons, 8th Edition.

REFERENCES:



- IMPLEMENTING SIX SIGMA – SMARTER SOLUTIONS USING STATISTICAL METHODS, *Forrest W. Breyfogle III*, John Wiley & Sons, 2nd Edition.



- SIX SIGMA POCKET GUIDE, *Rath & Strong*, Rath & Strong, Inc; Spiral edition.



- WHAT IS SIX SIGMA, *Peter S. Pande & Larry Holpp*, McGraw-Hill Trade.



Objective:

The purpose of this course is to provide the student with the most advanced areas of the knowledge of Six Sigma black-belt training. Topics include factorial designs, fractional factorial experiments, response surface methodology, robust design and process, Design for Six Sigma and other advanced six sigma tools and techniques.

Requirements:

Major emphasis will be placed on reading and understanding the material from the class, suggested reference material, and in homework assigned.

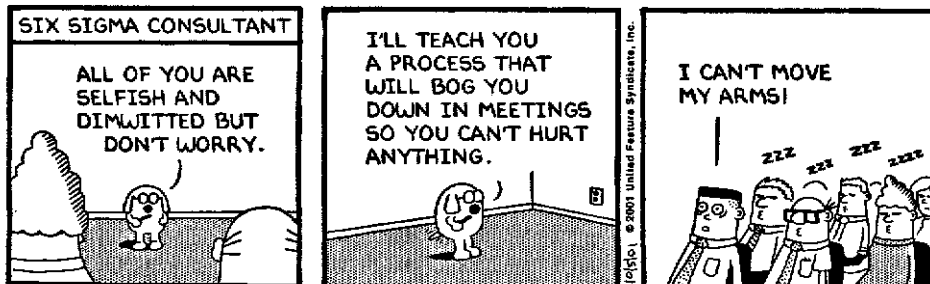
Grading:

- 3 Examinations, each of which counts 20% towards your grade.
- Homework and Quizzes, which count 20% towards your grade.
- Final Project, which counts 20% towards your grade.

Standards:

Letter grades are assigned based on the total number of points accumulated.

- A : 90% and higher
- B : 80% - 89.99%
- C : 70% - 79.99%
- D : 60% - 69.99%
- F : Less than 60%



Grading Policy:

Assignments are due at class time. Missed examinations and assignments have a 10% penalty per day, imposed when turned in, unless an appropriate, prior excuse is provided to the instructor. The missed examination must be completed on the make-up date set by the instructor.

Academic Conduct:

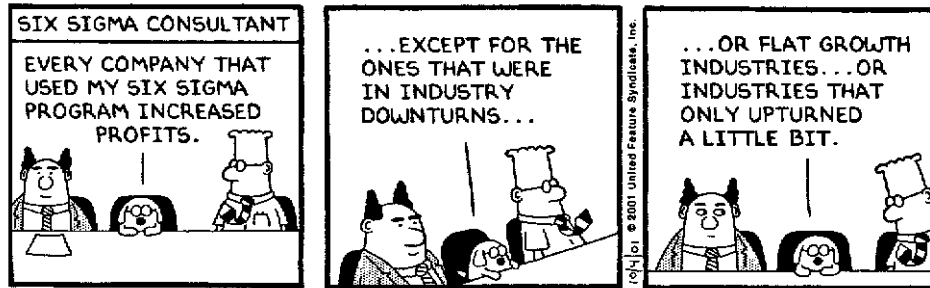
Cheating on examinations, submitting work of other students as your own, or plagiarism in any form will result in penalties ranging from an **F** on the assignment to expulsion from the university, depending on the seriousness of the offense.

Office Hours:

10:30 am to 12:00 m on Mondays, 11:00 am to 12:00 m. on Tuesdays, 10:00 am to 12:00 m. on Wednesdays, 2:00 pm to 3:30 pm on Thursdays; other hours by appointment.

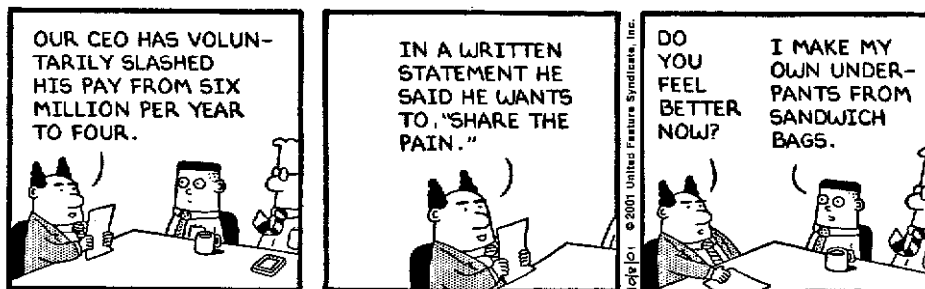
Equipment and Software:

Hand-held calculator and any computer-based spreadsheet.



Schedule:

<u>LESSON</u>	<u>TOPIC</u>
1	Graeco-Latin Square Design & Model Adequacy Checking
2	Graeco-Latin Square: Duncan's Test & Sample Size Analysis
3	Introduction to Factorial Designs & Model Adequacy Checking
4	Factorial: Duncan's Comparisons Test & Choice of Sample Size
5	2^2 Factorial Design & Model Adequacy Checking
6	2^2 Factorial: Duncan's Comparisons Test & Choice Sample Size
7	2^3 Factorial Design & Model Adequacy Checking
8	2^3 Factorial: Duncan's Comparisons Test & Choice Sample Size
9	2^k Factorial Design & Model Adequacy Checking
10	2^k Factorial: Duncan's Comparisons Test & Choice Sample Size
11	2^{k-1} Fractional Factorial Design & Model Adequacy Checking
12	2^{k-2} Fractional Factorial Design & Model Adequacy Checking
13	Introduction to Response Surface Methods
14	Introduction to Taguchi Methods



SIU Policy on Incomplete Grades:

An INC is assigned when, for reasons beyond their control, students engaged in passing work are unable to complete all class assignments. An INC must be changed to a completed grade within a time period designated by the instructor but not to exceed one year from the close of the term in which the course was taken, or graduation,

whichever occurs first. Should the student fail to complete the course within the time period designated, not to exceed one year, or graduation, whichever occurs first, the incomplete will be converted to a grade of F and the grade will be computed in the student's grade point average. Students should not reregister for courses in which an INC has been assigned with the intent of changing the INC grade. Re-registration will not prevent the INC from being changed to an F.

Mobile Technology Policy:

Cell phones should be turned off during class-time (including during tests).

Inclusive Excellence:

SIU contains people from all walks of life, from many different cultures and sub-cultures, and representing all strata of society, nationalities, ethnicities, lifestyles, and affiliations. Learning from and working with people who differ from you is an important part of your education in this class, as well as an essential preparation for any career.

SIU Student Code of Conduct/Plagiarism:

Please consult the following sites for information on the SIU's student code of conduct and Morris Library's guide on plagiarism:

- SIU Student Code of Conduct:
<http://policies.siu.edu/documents/StudentConductCodeFINALMay32011.pdf>
- Morris Library Guide on Plagiarism: <http://libguides.lib.siu.edu/plagiarism>

Emergency Procedures:

Southern Illinois University Carbondale is committed to providing a safe and healthy environment for study and work. Because some health and safety circumstances are beyond our control, we ask that you become familiar with the S.I.U.C. Emergency Response Plan and Building Emergency Response Team (BERT) program. Emergency response information is available on posters in buildings on campus, available on the BERT's website at www.bert.siu.edu, Department of Public Safety's website www.dps.siu.edu (disaster drop down) and in the Emergency Response Guidelines pamphlet. Know how to respond to each type of emergency.

Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency. The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or sheltering within the facility.

Resources for Academic Assistance:

- Learning Support Services: <http://tutoring.siu.edu/>
 - Provides academic assistance in courses/tutoring
- Disability Support Services: <http://disabilityservices.siu.edu/>
 - Provides the required academic and programmatic support services to students with permanent and temporary disabilities
- SIUC Writing Center: <http://write.siu.edu/>
 - Offers free tutoring services to all SIUC undergraduate and graduate students and faculty.

SIU Email Policy:

Official SIU Student Email Policy: <http://policies.siu.edu/policies.email.htm>

Saluki Cares:

The purpose of Saluki Cares is to develop, facilitate and coordinate a university-wide program of care and support for students in distress. By working closely with faculty, staff, students and their families, SIU Carbondale continues to display a culture of care by demonstrating to our students and their families that they are an important part of the community. To make a referral to Saluki Cares click, call, or send: <http://salukicare.siu.edu/index.html>, (618) 453-5714, or siucares@siu.edu.

Minimum Student Competencies:

- Understand Factorial designs of experiments
- Understand Fractional Factorial designs of experiments
- Understand limitations of fractional factorials due to confounding.
- Apply Taguchi robustness concepts and techniques such as signal-to-noise ratio, controllable and noise factors, and robustness to external sources of variability.
- Construct experiments and apply computational and graphical methods to analyze the significance of results.
- Construct higher-order experiments such as CCD, Box-Behnken, and apply computational and graphical methods to analyze the significance of results.
- Understand functional requirements of a design.
- Develop a robust design using noise strategies.
- Construct mixture experiments and apply computational and graphical methods to analyze and evaluate the significance of results.
- Understand the application and strategy of EVOP.
- Understand appropriate use of short-run SPC, EWMA, CuSum, and moving average.

