

STA 4664/5666 Statistics for Quality and Productivity Fall 2017

Course Info

Instructor: Dr. Steven Ramsier

Office: 106A OSB

Office hours: 10:00 – 11:00 AM Wednesdays, 11:00 AM – 12 Noon Thursday, or by appointment.

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Class URL: fsu.instructure.com

Key Dates

Class Meeting Times: 9:30 AM – 10:45 AM in 108 OSB, Tuesdays and Thursdays

Scheduled Exam: Thursday, November 16

Assignments Due: Sept. 14, Oct. 5, Oct. 26, and Nov. 30 (All Thursdays)

STA5666 Presentations: November 7 and 9 (if necessary)

Project Presentations: Tuesday, December 5 and Thursday, December 7

No Final Exam Scheduled

Course Details

Text (Recommended): Montgomery, D.C. (2013), *Introduction to Statistical Quality Control*, Wiley, 7th Edition; ISBN: 978-1-118-14681-1; E-Text ISBN: 978-1-118-32416-5.

Other references will be provided during the course of the semester.

Prerequisite: One of STA 2122, 2171, 3032, 4442, 4321 or consent of instructor.

Software: Access to JMP 13 and SAS Studio (OnDemand version) or SAS 9.4. JMP and SAS 9.4 are available on campus computer labs. Students may obtain JMP from the department for free and free online access to SAS through SAS Studio OnDemand.

Course Description: An investigation of Deming's ideas, graphical methods, quality tools, measurement system assessment, control charts, design of experiments for product and process improvement.

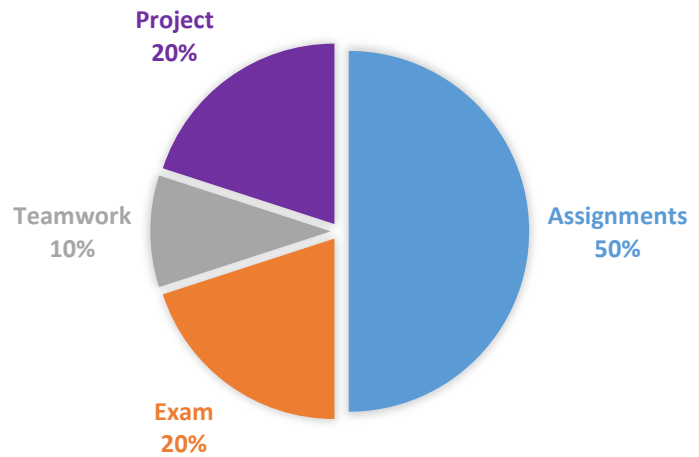
Course Objectives: Students who complete this course will be able to:

- Understand the vital importance of process control over product (output) control.
- Discuss the role of statistics in quality function deployment in an organization.
- Understand various approaches to quality improvement (Six Sigma, TQM, ISO standards).
- Structure quality improvement activities using the DMAIC (Define-Measure-Analyze-Improve-Control) methodology.
- Construct and interpret appropriate control charts.
- Calculate and interpret capability indices.
- Conduct various measurement system assessment studies.
- Plan and perform a sequence of designed experiments, letting previous experiments inform the next.
- Implement an acceptance sampling plan.
- Choose the appropriate technique useful for a given quality problem.
- Describe the underlying statistical principles of the techniques applied.
- Apply these techniques in the spirit of continuous process improvement.
- Interpret and communicate results of techniques implemented to non-technical audiences.

Grades

Grade Composition (Course Points):

4 Take-Home Assignments (125 each)	500
1 Comprehensive Exam	200
5 Teamwork's (20 each)	100
Graduate Student Presentation	50
Graduate Student Project	150
Undergraduate Team Project	200
<u>Project or Presentation/Project Component</u>	<u>200</u>
Total Points for the Course	1000



Grade Assignments:

A	930-1000	B-	800-829	D+	670-699
A-	900-929	C+	770-799	D	630-669
B+	870-899	C	730-769	D-	600-629
B	830-869	C-	700-729	F	0-599

Assignments and Responsibilities

Take-Home Assignments: The assignments will consist of a combination of homework-style problems, software applications, and simulated consulting scenarios where you are required to make a recommendation and demonstrate a solution to the problem. You are free to discuss the assignment with any of your classmates; however, students may not “work together” as write-ups must be done independently. That is, **you must generate all your own written material**, your interpretations must be **in your own words**, and **you must generate all of your own JMP/SAS output**. Graduate students will be asked to complete an extra problem on each assignment. Late, unexcused assignments will be penalized as follows: One day late: 90% of grade, two days late: 75% of grade, and no credit for more than two days late.

Exam: One comprehensive exam will be given with a duration of one class period. The exam is open book and open note. Graduate students may be asked to work additional questions. In general no make-up exams are given unless a medical issue or personal/family emergency prevents you from taking the exam. Documentation is needed for make-ups.

STA 5666 Presentation: This is an oral presentation given to the class by graduate students (STA5666 students only). It will consist of statistical approach or theory to a quality issue found in a professional journal, magazine, or recent text section focusing on quality and process improvement. Examples of such magazines and journals are *Quality Magazine*, *Quality Progress*, *Six Sigma Forum*, *Journal of Quality Management*, *Quality Engineering*, *the Journal of Quality Technology*, and *Technometrics*. You will be asked also identify any of the elements of the DMAIC methodology that were related to the article and translate how the application may be applied in other situations. The techniques used should be new to the class (i.e., a modification or something completely different than was covered in class). This will count for 50 out of the 200 points allocated to the course project for STA5666.

Teamwork: Several in-class group activities will be carried out during the term. These activities are designed to reinforce concepts learned, provide practical experience with quality improvement, and build teamwork. Some of the activities may facilitate completing teams’ course projects. There are no opportunities to make up teamwork. Missed teamwork grades will be replaced by the percentage made on the exam scaled to a score between 0 and 20.

Team Project: STA4664 students may work in teams of 3 or 4. STA5666 students may work with one other individual (team of 2). The project will focus on the quality improvement of some process of your own choosing. The project should focus on a process that is familiar all team members for which you believe can be improved. The strategy of improvement for the project will be to first assess your measurement process, monitor the process using an appropriate control chart, and design an experiment that is sequentially conducted, and analyzed. In addition, other elements of the six sigma methodology, DMAIC (Define-Measure-Analyze-Improve-Control), will be incorporated. Teams will develop a proposal, carry out the study, and present results during a class poster session. The project is worth all of the 200 allocated points for STA4664 students and 150 out of the 200 project points for STA5666 students.

University Information

University Attendance Policy:

Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

Academic Honor System:

The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to ". . . be honest and truthful and . . . [to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at <http://fda.fsu.edu/Academics/Academic-Honor-Policy>.)

Americans with Disabilities Act:

Students with disabilities needing academic accommodation should:

- (1) register with and provide documentation to the Student Disability Resource Center; and
- (2) bring a letter to the instructor indicating the need for accommodation and what type.

Please note that instructors are not allowed to provide classroom accommodation to a student until appropriate verification from the Student Disability Resource Center has been provided.

This syllabus and other class materials are available in alternative format upon request.

For more information about services available to FSU students with disabilities, contact the:

Student Disability Resource Center
874 Traditions Way
108 Student Services Building
Florida State University
Tallahassee, FL 32306-4167
(850) 644-9566 (voice)
(850) 644-8504 (TDD)
sdrc@admin.fsu.edu
<http://www.disabilitycenter.fsu.edu/>

Syllabus Change Policy: Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.

Tentative Schedule

Tuesday	Thursday		Tuesday	Thursday
August 29, 2017	August 31, 2017		October 24, 2017	October 26, 2017
Intro Quality Definition Quality Systems Ch. 1	Six Sigma Ch. 2 QFD		Overview of Experimentation 13-1, 13-2, 13-3 SAS Ex. 3 Due	Sequential Exp. 13-4, 13-5, 13-6 HW 3 Due
September 5, 2017	September 7, 2017		October 31, 2017	November 2, 2017
Basic Quality Tools 5-4 Critical to Quality (CTQ's) Process	Understanding Process Teamwork 1		Teamwork 4	Process Optimization Ch 14-1, 14-2
September 12, 2017	September 14, 2017		November 7, 2017	November 9, 2017
Process Continued, SAS	SPC Concepts 5-1, 5-2, 5-3, 5-4 HW 1 Due		Graduate Presentations	Graduate Presentations (if necessary) Response Surface
September 19, 2017	September 21, 2017		November 14, 2017	November 16, 2017
SPC Concepts 5-6 Variables Control Charts 6-1, 6-2	Variables Control Charts 6-3, 6-4		EVOP 14-3 Teamwork 5	Comprehensive Exam
September 26, 2017	September 28, 2017		November 21, 2017	November 23, 2017
Teamwork 2	More Variables Control Charts 6-5, 6-6		Acceptance Sampling Overview Ch. 15 & 16 Project Overview	Thanksgiving No Class
October 3, 2017	October 5, 2017		November 28, 2017	November 30, 2017
Attribute Control Charts 7-1, 7-2, 7-3, 7-4, 7-5	CUSUM & EWMA 9-1, 9-2 Other SPC Charts HW 2 Due		Acceptance Sampling and SAS	Project Day HW 4 Due
October 10, 2017	October 12, 2017		December 5, 2017	December 7, 2017
Capability 8-1, 8-2, 8-3, 8-4	Measurement Systems Assessment (MSA) 8-7, 8-8		Project Results Presentations	Project Results Presentations
October 17, 2017	October 19, 2017			
Teamwork 3	More MSA 8-8			