STA 4664/5666 Statistics for Quality and Productivity
Fall 2021

Course Info

Instructor: Dr. Steven Ramsier
Office: 102B OSB
Office hours: 1:00 – 2:00 PM Wednesday, 11:30 AM – 12:30 PM Thursday, or by appointment.
E-mail: ramsier@stat.fsu.edu **Phone:** 644-3218 (Main Office) **Fax:** 644-5271
Class URL: canvas.fsu.edu

TA/Grader: Xiaoyi Wang **E-mail:** xw18b@my.fsu.edu

Key Dates

Class Meeting Times:	1:20 PM – 2:35 PM in 110 OSB, Tuesdays and Thursdays
Scheduled Exams:	Oct. 7 & Nov. 18
Assignments Due:	Sept. 9, Sept. 30, Oct. 21, & Nov. 9
STA5666 Presentations:	Nov. 2
Project Presentations:	Nov. 30 & Dec. 2
Final Period:	Thursday, Dec. 9, 12:30 PM – 2:30 PM (if needed for presentations)

Course Details

Text (Recommended): Montgomery, D.C. (2019), *Introduction to Statistical Quality Control*, Wiley, 8th Edition; ISBN: 978-1-119-39930-8.

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 and SAS Studio (OnDemand version) or SAS 9.4. JMP and SAS 9.4 are available FSU's virtual computer lab (myFSUVLab). Students may obtain JMP for their personal computer 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.

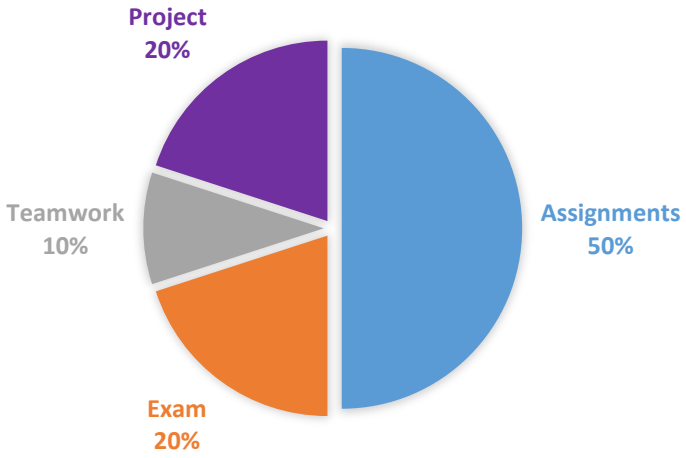
Course Objectives: Students who complete this course will be able to:

- 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
2 Midterm Exams (100 each)		200
5 Teamwork's (20 each)		100
Graduate Student Presentation	50	
Graduate Student Project	150	
Undergraduate Team Project	200	
Project or Presentation/Project Component		200
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.

Generally, you will be asked to generate a Word-compatible document to which you can paste asked for code or output and compose typed solutions or typed explanations. Your finished document will be uploaded to Canvas by the due date and time. 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.

Exams: Two midterm exams will be given, each with a duration of one class period. The exam is closed book but open notes. Notes must be on paper and no electronic forms (computer, tablet, smartphone, etc.) will be permitted. 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-up approval by the instructor.

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.

**Should COVID considerations render group activities inappropriate, we reserve the right to create substitute activities that are either virtual or individual in nature.

Team Project: STA4664 students may work in teams of 3 or 4. STA5666 students may work individually or 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 findings. The project is worth all of the 200 allocated points for STA4664 students and 150 out of the 200 project points for STA5666 students.

(Tentative schedule on next page.)

Tentative Schedule

Tuesday	Thursday		Tuesday	Thursday
August 24, 2021	August 26, 2021		October 19, 2021	October 21, 2021
Intro Quality Definition Quality Systems Ch. 1	Six Sigma Ch. 2 QFD		**Teamwork 4**	Overview of Experimentation 13-1, 13-2, 13-3 **HW 3 Due**
August 31, 2021	September 2, 2021		October 26, 2021	October 28, 2021
Basic Quality Tools 5-4 Critical to Quality (CTQ's) Process	Understanding Process **Teamwork 1**		Sequential Exp. 13-4, 13-5, 13-6	Process Optimization Ch 14-1, 14-2
September 7, 2021	September 9, 2021		November 2, 2021	November 4, 2021
Process Continued, SAS	SPC Concepts 5-1, 5-2, 5-3, 5-4 **HW 1 Due**		Graduate Presentations	Response Surface EVOP 14-3
September 14, 2021	September 16, 2021		November 9, 2021	November 11, 2021
SPC Concepts 5-6 Variables Control Charts 6-1, 6-2	Variables Control Charts 6-3, 6-4		**Teamwork 5** **HW 4 Due**	**No Class**
September 21, 2021	September 23, 2021		November 16, 2021	November 18, 2021
Teamwork 2	More Variables Control Charts 6-5, 6-6		Acceptance Sampling Ch. 15 Project Overview	**Exam 2**
September 28, 2021	September 30, 2021		November 23, 2021	November 25, 2021
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**		Project Day	**Thanksgiving** **No Class**
October 5, 2021	October 7, 2021		November 30, 2021	December 2, 2021
Teamwork 3	**Exam 1**		**Project Results Presentations**	**Project Results Presentations**
October 12, 2021	October 14, 2021			
Capability 8-1, 8-2, 8-3, 8-4	Measurement Systems Assessment (MSA) 8-7, 8-8			

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/academic-resources/academic-integrity-and-grievances/academic-honor-policy).

Americans with Disabilities Act:
Florida State University (FSU) values diversity and inclusion; we are committed to a climate of mutual respect and full participation. Our goal is to create learning environments that are usable, equitable, inclusive, and welcoming. FSU is committed to providing reasonable accommodations for all persons with disabilities in a manner that is consistent with academic standards of the course while empowering the student to meet integral requirements of the course.

To receive academic accommodations, a student:
(1) must register with and provide documentation to the Office of Accessibility Services (OAS);
(2) must provide a letter from OAS to the instructor indicating the need for accommodation and what type; and,
(3) should communicate with the instructor, as needed, to discuss recommended accommodations. A request for a meeting may be initiated by the student or the instructor.

Please note that instructors are not allowed to provide classroom accommodations to a student until appropriate verification from the Office of Accessibility Services 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

Office of Accessibility Services
874 Traditions Way
108 Student Services Building
Florida State University
Tallahassee, FL 32306-4167
(850) 644-9566 (voice)
(850) 644-8504 (TDD)
oas@fsu.edu
https://dsst.fsu.edu/oas

Confidential Campus Resources:
Various centers and programs are available to assist students with navigating stressors that might impact academic success. These include the following:

Victim Advocate Program
University Center A, Rm. 4100
(850) 644-7161
Available 24/7/365
Office Hours: M-F 8-5
https://dsst.fsu.edu/vap

Counseling and Psychological Services
Askew Student Life Center, 2nd floor
942 Learning Way
(850) 644-8255
https://counseling.fsu.edu/

University Health Services
Health and Wellness Center
(850) 644-6230
https://uhs.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.

Statement On In-Class Masking:
To maintain consistency with state law, FSU is not requiring face-coverings, but public health experts strongly recommend that we continue to wear proper masks in public indoor spaces, like classrooms, where social distancing is not possible and large numbers of participants remain unvaccinated. While many of us are now vaccinated, others of us cannot be vaccinated, remain extremely vulnerable to the virus, or have family members in these situations. Moreover, Florida has become an epicenter of the COVID-19 Delta variant, which we now know can infect even vaccinated individuals and be spread by vaccinated individuals to others. For that reason, we strongly urge class participants to remain masked in the classroom. If any class members inform me that they are vulnerable in these ways, I may specifically request masks in the classroom. Please remember that you should NOT attend class in person if you have tested positive for COVID-19 or are quarantining after exposure. Finally, please bear in mind that the Covid-19 situation is fast moving and that guidance may change at any time.