

**San José State University**  
**College of Engineering, Department of Aviation & Technology**

**Tech 31, Quality Assurance and Control**

**Section 01, Spring 2018**

**Course and Contact Information**

|                         |   |
|-------------------------|---|
| <b>Instructor:</b>      | Nazanin Nader                             |
| <b>Email:</b>           | Nazanin.Nader@sjsu.edu                    |
| <b>Office Hours:</b>    | Mondays and Wednesdays 9:15 AM – 10:15 PM |
| <b>Office room:</b>     | IS 117B                                   |
| <b>Class Days/Time:</b> | Mondays and Wednesdays 10:30 - 11:45 AM   |
| <b>Classroom:</b>       | Engineering Building 103                  |
| <b>Prerequisites:</b>   | BUS 90 or equivalent.                     |

**Course Format**

This course is a Lecture course, combining weekly lectures with various assignments to support the material learned in lectures. Delivery is in-person with web augmentation for course documents, assignments, and record keeping, using the SJSU Campus CANVAS shell. Students will find it convenient, but not required, to have access to a laptop computer during class meetings.

**Faculty Web Page and MYSJSU Messaging**

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on the *on [Canvas Learning Management System course login website](#)*. You are responsible for regularly checking with the messaging system through [MySJSU](#) (or other communication system as indicated by the instructor) to learn of any updates. In addition, lecture notes, slides presented in class, and other course material will be posted in the CANVAS learning system shell. The material will normally be posted the evening of the class meeting in which it was discussed.

**Course Description**

Introduction to concepts and statistical methods that companies use to manage and improve quality. Sampling inspection, statistical process control, quality function deployment, cost of quality, design of experiment and Taguchi's method for designing in quality. Lecture 3 hours.

## Overview of Course

This is a core course required for all BS Industrial Technology majors and is designed to help students develop an understanding and working knowledge of the concepts, principles, and applications of Quality as related to industrial and business environments. Tech 031 includes lecture, activity, and homework components designed to augment the contents of its instructional units.

The course is divided into six (6) instructional units. Each unit has associated objectives and assigned readings related to those objectives. Within these are class activities, and individual and group projects designed for a comprehensive understanding of quality systems.

## General Course Goals

1. Comprehend quality issues and their implications to industry and society.
2. Develop a general understanding of common quality systems employed in
  1. industry.
  2. Understand basic statistical principles inherent in modern quality control
  3. systems.
  4. Design appropriate quality systems to solve industrial quality problems.
  5. Develop a higher responsible attitude regarding quality matters.

## Course Learning Outcomes

1. Demonstrate strong communication, critical thinking and interpersonal skills
2. Demonstrate skills in team development, dynamics, and management to work as team players
3. Demonstrate skills in the planning and design of manufacturing processes.
4. Use the principles of production scheduling & planning in an industrial environment

## Required Texts/Readings

### Textbook

Besterfield, D., Quality Improvement (9th. Ed, 2012). Prentice Hall publisher.

(The eText for this text book is available to students [HERE](#) for \$42.99.

<http://www.mypearsonstore.com/bookstore/quality-improvement-subscription-9780133073515?xid=PSED> )

### Other Readings

All reading assignments should be completed before their assigned dates. Students are expected to be prepared to discuss them on those dates. Reading materials should be read before they are discussed in class.

### Other technology requirements / equipment / material

- Scientific hand calculator
- Any handbook/online material on learning the Microsoft Excel spreadsheet program
- Laptop/notebook computer running a current version of MS Excel

## **Outline of Course Content and Unit Objectives:**

### **UNIT 1: Introduction to Quality Improvement**

- a. Introduction
- b. Lean Enterprise
- c. Six Sigma
- d. Statistical Process Control (SPC)
- e. Fundamentals of Statistics

#### **Reading List for Unit 1:**

1. Besterfield, pp. 1-53
2. Lecture, presentations, handouts as needed

### **UNIT 2: Control Charts for Variables**

- a. Introduction
- b. Control Chart Techniques
- c. State of Control
- d. Specification
- e. Process Capability
- f. Other Control Charts

#### **Reading List for Unit 2:**

1. Besterfield, pp. 58-86
2. Lecture, presentations, handouts as needed

### **UNIT 3: Additional SPC Techniques for Variables**

- a. Continuous and Batch Processes
- b. Multi Variable Chart
- c. Short-Run SPC
- d. Gauge Control

#### **Reading List for Unit 3:**

1. Besterfield, pp. 95-108
2. Lecture, presentations, handouts as needed

### **UNIT 4 A: Fundamentals of Probability**

- a. Introduction
- b. Basic Concepts
- c. Theorems of probability
- d. Discrete Probability Distributions
- e. Continuous Probability Distribution
- f. Distribution Interrelationship

#### **Reading List for Review Unit**

1. Besterfield, pp. 110-120
2. Lecture, presentations, handouts as needed

### **UNIT 4 B: Control Charts for Attributes**

- a. Introduction
- b. Control Chart for Nonconforming (Defective) Units
- c. Control Charts for Count of Nonconformities (Number of Defects)
- d. Quality Rating Systems

**Reading List for Unit 4:**

- 1. Besterfield, pp. 123-142
- 2. Lecture, presentations, handouts as needed.

**UNIT 5. Acceptance Sampling**

- a. Fundamental Concepts of Sampling
- b. Statistical Aspects
- c. Sampling Plan Design
- d. Sampling Plan Systems

**Reading List for Unit 5:**

- 1. Besterfield, pp. 149-166
- 2. Lecture, presentations, handouts as needed

**UNIT 6. Reliability**

- a. Fundamental Aspects
- b. Statistical Aspects
- c. Life & Reliability Testing Plans

**Reading List for Unit 6:**

- 1. Besterfield, 169- 175
- 2. Lecture, presentations, handouts as needed

**Course Requirements and Assignments**

In order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found from [University Syllabus Policy S16-9](http://www.sjsu.edu/senate/docs/S16-9.pdf) at <http://www.sjsu.edu/senate/docs/S16-9.pdf>.

**Grading Information**

**Quizzes and In-Class Assignments (15%):**

There will be pop quizzes from previous session with no announcements. Please be prepared every session. There will also be some in-class assignments from the subject covered in the same class. It will be the responsibility of the student to attend all classes and complete all class activities. There will be **no makeups** for either quiz or in-class assignments except for extreme circumstances that must be documented.

**Homework (20%):**

There will be homework assignments almost every week. Students are responsible for finding out about each homework assignment and the due date. Make sure to ask your classmates and check canvas if you miss a class. All assignments will be on canvas after announced in class.

- Late homework assignment will be accepted for 70% of its grade within one session from its due date.
- Students' lowest homework grade will be dropped.

- Please turn in your homework using the instruction given. For the assignments that are required to post on Canvas, submit the files using the given formats.
- **Students are not allowed to copy homework from each other or any other source** such as sites like Chegg.com, etc. It should be your own work. All parties involved in suspected duplicate work will get no credit, and be submitted to the office of Student Conduct and Ethical Development using the university's academic policy.

**Mid-Term (20%):**

There will be two (2) exams in the course of this semester, one mid-term and one final. The mid-term is worth 20% of your final grade. There will be no makeups unless for extreme circumstances that are documented.

**Final (30%):**

The final exam is worth 30% of your final grade. It will be cumulative, administered on Monday, May 21, 2018, 9:45 AM to 12:00 PM. Please double check exam time and location on the university website. There will be no makeups unless for extreme circumstances that are documented.

**Research Project Assignment (15%):**

Please refer to and follow the Research Project Assignment Guide that will be provided in class and on Canvas.

**Semester Grading:**

Assignments, quizzes, exams or exercises will be equated and graded as follows:

|   |      |
|---|------|
| Midterm Examination                       | 20%  |
| Final Examination                         | 30%  |
| Class quizzes, exercises, and assignments | 15%  |
| Homework assignments                      | 20%  |
| Research project deliverables             | 10%  |
| Class research project presentation       | 5%   |
| Total possible points                     | 100% |

All of the above criteria will be recorded by the point system and will be totaled at the end of the semester to be converted to the following letter grades:

**Grading Scale:**

|              |            |             |
|--------------|------------|-------------|
| A+ = 100-97% | A = 96-93% | A- = 92-90% |
| B+ = 89-87%  | B = 86-83% | B- = 82-80% |
| C+ = 79-77%  | C = 76-73% | C- = 72-70% |
| D+ = 69-67%  | D = 66-63% | D- = 62-60% |
| F = 59-0%    |            |             |

## Tech31, Section 01, Spring 2018, Course Schedule

| Session | Date       | Topics  | Readings                      |
|---------|------------|---|-------------------------------|
| 1       | 01/24/2018 | Orientation to the course, Chapter 1 – Intro to Quality Improvement | Besterfield, PP. 1-4, 184-193 |
| 2       | 01/29/2018 | Lecture on Chapter 1 continued, Chapter 2 – Lean Enterprise         | Besterfield PP. 5-10          |
| 3       | 01/31/2018 | Chapter 3 – Six sigma   | Besterfield PP. 11-18         |
| 4       | 02/05/2018 | Chapter 4 – Statistical Process Control                             | Besterfield PP. 19-26         |
| 5       | 02/07/2018 | Chapter 5 – Fundamentals of Statistics                              | Besterfield PP. 27-57         |
| 6       | 02/12/2018 | Chapter 5 – Fundamentals of Statistics                              | Besterfield PP. 27-57         |
| 7       | 02/14/2018 | Chapter 5 – Fundamentals of Statistics                              | Besterfield PP. 27-57         |
| 8       | 02/19/2018 | Chapter 5 – Fundamentals of Statistics                              | Besterfield PP. 27-57         |
| 9       | 02/21/2018 | Chapter 6 – Control Charts for Variables                            | Besterfield PP. 58-94         |
| 10      | 02/26/2018 | Chapter 6 – Control Charts for Variables                            | Besterfield PP. 58-94         |
| 11      | 02/28/2018 | Chapter 6 – Control Charts for Variables                            | Besterfield PP. 58-94         |
| 12      | 03/05/2018 | Chapter 6 – Control Charts for Variables                            | Besterfield PP. 58-94         |
| 13      | 03/07/2018 | Review for the Midterm – In class assignment                        | Besterfield PP. 1-94          |
| 14      | 03/12/2018 | <b>Midterm</b> (the schedule is subject to change with fair notice) | <b>Chapters 1-6</b>           |
| 15      | 03/14/2018 | Introduction to the semester Project – Midterm review               |                               |
| 16      | 03/19/2018 | Chapter 8 – Fundamentals of Probability                             | Besterfield PP. 110-120       |
| 17      | 03/21/2018 | Chapter 8 – Fundamentals of Probability                             | Besterfield PP. 110-120       |
| 18      | 03/26/2018 | <b>SPRING RECESS (NO CLASS)</b>                                     |                               |
| 19      | 03/28/2018 | <b>SPRING RECESS (NO CLASS)</b>                                     |                               |

| <b>Session</b>    | <b>Date</b> | <b>Topics</b>   | <b>Readings</b>         |
|-------------------|-------------|---|-------------------------|
| 20                | 04/02/2018  | Chapter 8 – Fundamentals of Probability   | Besterfield PP. 110-120 |
| 21                | 04/04/2018  | Chapter 9 – Control Charts for Attributes   | Besterfield PP. 123-148 |
| 22                | 04/09/2018  | Chapter 9 – Control Charts for Attributes   | Besterfield PP. 123-148 |
| 23                | 04/11/2018  | Chapter 9 – Control Charts for Attributes   | Besterfield PP. 123-148 |
| 24                | 04/16/2018  | Open for project presentations  |                         |
| 25                | 04/18/2018  | Open for project presentations  |                         |
| 26                | 04/23/2018  | Open for project presentations  |                         |
| 27                | 04/25/2018  | Chapter 7 – Additional SPC Techniques for Variables                                       | Besterfield PP. 95-109  |
| 28                | 04/30/2018  | Chapter 10 – Acceptance Sampling  | Besterfield PP. 149-169 |
| 29                | 05/02/2018  | Chapter 11 – Reliability  | Besterfield PP. 169-183 |
| 30                | 05/07/2018  | Chapter 11 – Reliability<br>Chapter 14 – Introduction to Taguchi method (if time permits) | Besterfield PP. 211-235 |
| 31                | 05/09/2018  | Review and in-class assignment  |                         |
| 32                | 05/14/2018  | Last day of class - Final review  |                         |
| <b>Final Exam</b> | 05/21/2018  | 9:45 AM to 12:00 PM (Location: Eng103)  | <b>Chapters 1-11</b>    |

The schedule is subject to change with fair notice made in class. Please make sure to be present in class and ask your classmates about the class if absent.

### **University Policies**

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at <http://www.sjsu.edu/gup/syllabusinfo/>"