Syllabus for MANE 4311, revision 0
Fall 2015

This document contains the following information:

- Instructor Information
- Course Name, Number and Prerequisite
- Course Description
- Course Requirements and Evaluation
- Required Course Materials
- Course Policies
- Final Comments
- Course Schedule
- Important University Dates
- Course Outcomes

INSTRUCTOR INFORMATION

Instructor: Dr. Doug Timmer
Office: Engineering 1.294D
Office phone: 956-665-2608
e-mail: douglas.timmer@utrgv.edu

Course Schedule

Monday, Wednesday 8:00 - 9:15 am

Office Hours

- Monday 9:25 - 10:40 am
- Tuesday 9:25 - 10:40 am
- Wednesday 9:25 - 10:40 am
- Thursday 9:25 - 10:40 am
- or by appointment

COURSE NAME, NUMBER AND PREREQUISITE

Quality Control, MANE 4311

Prerequisite: MANE 2332, Engineering Statistics.

Please note: Students not satisfying the prerequisite will be dropped from the course.


COURSE DESCRIPTION

"Study of statistical methods applied to the assurance of product quality. Foundation principles developed by Juran, Deming and others will be applied. Sampling techniques and control charts will be applied. Concepts of statistical process control will be emphasized throughout. Design of experiments and Taguchi-type methodologies will be applied."

Course Format

This course will be taught in a lecture format augmented with BlackBoard. The course consists of textbook, assigned readings, and the BlackBoard course site, which contains lessons and communications tools including a bulletin board and an e-mail system. It is recommended that you log onto the course BlackBoard site several times a week (preferably at least three times - not all in the same day). For a more detailed look at the course contents, refer to the course schedule and table of important university dates.

COURSE REQUIREMENTS AND EVALUATION

Your performance in this course will be evaluated in the following manner:

<table>
<thead>
<tr>
<th>Component</th>
<th>% of Overall Grade</th>
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<tbody>
<tr>
<td>In-class exams</td>
<td>30%</td>
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<tr>
<td>Final exam</td>
<td>15%</td>
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<tr>
<td>DOE Projects</td>
<td>20%</td>
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<tr>
<td>SPC Projects</td>
<td>20%</td>
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<tr>
<td>Homework</td>
<td>15%</td>
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In-class Exams

Two in-class exams will be administered in this course. Each exam is worth 15% of your overall grade. The first exam will cover the topics associated with the review of statistics. The second exam will cover the topics associated with design of experiments.

Final Exam

The final exam will cover the quality control related topics of the course and is worth 15% of the course grade. The final exam is not comprehensive but will require statistical analyses that were covered in earlier portions of the course.

DOE Projects

Two design of experiments projects will be assigned. The project total score is worth 20% of your semester grade. The first DOE project is an application of statistical tools to provide a benchmark of the project's current operations. The second DOE project is to perform a fractional factorial experiment. Components of the second project include documenting the knowledge gained, recommending a new operating condition and assessing the performance improvement gained by utilizing the new operating condition. The DOE projects
are individual projects.

**SPC Projects**

You will complete four Statistical Process Control projects. Your project score is worth 20% of your semester grade. The topics of each project are:

- SPC Project 1 - Magnificent 7 (SPC tools)
- SPC Project 2 - Control Charts for Variables
- SPC Project 3 - Control Charts for Attributes
- SPC Project 5 - Gage R&R Study

SPC Projects 1-3 are individual projects. SPC project 5 requires a group effort to establish reproducibility.

**Homework**

Individual homework assignments plus online quizzes will be given throughout the course. The homework average is 15% of your overall grade.

**Course Grade**

Students with an overall course average of 90-100% will receive an A. Those students earning an overall course average of 80 - 89% will receive a B. Students with an overall course average of 70 - 79% will receive an C. Students with an overall course average of 60 - 69% will receive an D and students with an overall average less than 60% will receive an F. I reserve the right to slightly lower the breakpoints for A's, B's, C's, and D's (curve the grades). However I will never raise the breakpoints for grades.

**REQUIRED COURSE MATERIALS**

The following materials are required for completion of Quality Control.

**Textbook**

The following textbook is required for this course. You must have a personal copy of the textbook. Besides containing excellent examples and homework problems, you will need the statistical tables in the back of the textbook to complete your exams. You will not be allowed to share textbooks or bring copies of the tables (copyright violating - illegal).


**BlackBoard**

This course will utilize BlackBoard for its course management software. BlackBoard is maintained by the Center for Online Teaching and Technology (COLTT). You can access BlackBoard through any Java-enabled web browser. Suitable web browsers are installed in the Intel computing lab in the Engineering building.

To access BlackBoard you need an UTRGV e-mail account. Most student should have an e-mail account as this is the method required to access the computers in the Engineering computer labs.
Minitab

There will be problems that can be easily analyzed using Minitab. UTRGV Computing Resources has purchased a license for Minitab that is installed in the Intel computing lab and other computer labs around campus. Should you desire a copy of Minitab for your home computer, you can rent a copy for either a semester or a full year. Information for this offer is available from Minitab.

COURSE POLICIES

Students with Disabilities

If you have a documented disability (physical, psychological, learning, or other disability which affects your academic performance) and would like to receive academic accommodations, please inform your instructor and contact Student Accessibility Services to schedule an appointment to initiate services. It is recommended that you schedule an appointment with Student Accessibility Services before classes start. However, accommodations can be provided at any time. Brownsville Campus: Student Accessibility Services is located in Cortez Hall Room 129 and can be contacted by phone at (956) 882-7374 (Voice) or via email at accessibility@utrgv.edu. Edinburg Campus: Student Accessibility Services is located in 108 University Center and can be contacted by phone at (956) 665-7005 (Voice), (956) 665-3840 (Fax), or via email at accessibility@utrgv.edu.

Sexual Harrassment, Discrimination, and Violence

In accordance with UT System regulations, your instructor is a “responsible employee” for reporting purposes under Title IX regulations and so must report any instance, occurring during a student’s time in college, of sexual assault, stalking, dating violence, domestic violence, or sexual harassment about which she/he becomes aware during this course through writing, discussion, or personal disclosure. More information can be found at www.utrgv.edu/equity, including confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect in an environment free from sexual misconduct and discrimination.

Attendance Policy

Students are expected to attend all scheduled classes and may be dropped from the course for excessive absences. UTRGV’s attendance policy excuses students from attending class if they are participating in officially sponsored university activities, such as athletics; for observance of religious holy days; or for military service. Students should contact the instructor in advance of the excused absence and arrange to make up missed work or examinations.

Late Work

Descriptions of each assignment, including due dates, will be provided throughout the course. All assignments should be completed by their due date. The course policy for late work is a 10% penalty per day for work submitted after the deadline. After one week, no credit will be given for late work. Certain assignments may not be accepted late to accommodate examination preparation. These assignments will be clearly identified. No late work will be accepted after study days.
Students who miss graded assignments will receive a grade of zero. If you are ill or have a serious problem that prevents you from submitting an assignment on the day it is due, please contact me prior to the due date and we will arrange an alternative date.

**Scholastic Integrity**

As members of a community dedicated to Honesty, Integrity and Respect, students are reminded that those who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and expulsion from the University. Scholastic dishonesty includes but is not limited to: cheating, plagiarism, and collusion; submission for credit of any work or materials that are attributable in whole or in part to another person; taking an examination for another person; any act designed to give unfair advantage to a student; or the attempt to commit such acts. Since scholastic dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced (Board of Regents Rules and Regulations and UTRGV Academic Integrity Guidelines). All scholastic dishonesty incidents will be reported to the Dean of Students.

**Course Drops**

According to UTRGV policy, students may drop any class without penalty earning a grade of DR until the official drop date. Following that date, students must be assigned a letter grade and can no longer drop the class. Students considering dropping the class should be aware of the “3-peat rule” and the “6-drop” rule so they can recognize how dropped classes may affect their academic success. The 6-drop rule refers to Texas law that dictates that undergraduate students may not drop more than six courses during their undergraduate career. Courses dropped at other Texas public higher education institutions will count toward the six-course drop limit. The 3-peat rule refers to additional fees charged to students who take the same class for the third time.

**Incomplete Grades**

"Incomplete” grades are not issued for student or faculty convenience; they may be used for compelling, non-academic circumstances beyond the student's control. Should a situation arise that you believe meets this criteria contact me to schedule an appointment so that we may discuss the situation.

**Mandatory Course Evaluations period**

Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account (http://my.utrgv.edu); you will be contacted through email with further instructions. Online evaluations will be available Nov. 18 – Dec. 9, 2015. Students who complete their evaluations will have priority access to their grades.

**FINAL COMMENTS**

I would ask you to be diligent and persistent in your studies. Remember the rule of thumb for time management in engineering courses, expect to spend three hours of preparation for each hour of lecture. That means to expect nine hours of studying, reading and practicing statistics per week beyond the three scheduled hours of lecture.
Keep a sense of humor. You will be learning new software and mastering new analytical techniques. Some times the best medicine is laughter.

Don't give up. If you are having problems, look to me or your fellow students for help. You have a variety of methods to contact me: in person at my office, by phone, by UTRGV e-mail or by BlackBoard e-mail.

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**Course Schedule**

| Aug. 31 | Course Introduction | Sep. 1 | Lecture 1: Chapter 1 |
| Sep. 7 | Labor Day Holiday (no class) | Sep. 9 | Lecture 2: Chapter 3 |
| Sep. 14 | Lecture 3: Chapter 3, DOE Project 1 Assignment | Sep. 16 | Lecture 4: Chapter 4 |
| Sep. 21 | Lecture 5: Chapter 4 | Sep. 23 | Lecture 6: Chapter 4 |
| Sep. 28 | Lecture 7: Chapter 5 | Sep. 30 | Test 1 (Chapters 3-4) |
| Oct. 5 | Lecture 8: Chapter 13 | Oct. 7 | Lecture 9: Chapter 13 |
| Oct. 12 | Lecture 10: Chapter 13, DOE Project 2 Assignment | Oct. 14 | Lecture 11: Regression Review (Chapter 4) |
| Oct. 26 | Lecture 14: Chapter 14, SPC Project 1 | Oct. 28 | Lecture 15: Chapter 5 |
| Nov. 2 | Test 2 (Chapter 13 - 14) | Nov. 4 | Lecture 16: Chapter 6 |
| Nov. 9 | Lecture 17: Chapter 6, SPC Project 2 | Nov. 11 | Lecture 18: Chapter 6 |
| Nov. 16 | Lecture 19: Chapter 7 | Nov. 18 | Lecture 20: Chapter 7 |
| Nov. 23 | Lecture 21: Chapter 7, SPC Project 3 | Nov. 25 | Lecture 22: Chapter 8 |
| Nov. 30 | Lecture 23: Chapter 8, SPC Project 5 | Dec. 2 | Lecture 24: ISO 9000, Chapter 2 |
| Dec. 7 | Review | Dec. 9 | Review |
| Dec. 14 | Final Exam 8:00am - 9:45am |

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**Important University Dates**

<table>
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<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>8/31/15</td>
<td>First day of classes</td>
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<td>9/17/15</td>
<td>Labor Day Holiday</td>
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<td>9/16/15</td>
<td>Census Day</td>
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<td>11/18/15</td>
<td>Drop/Withdrawl deadline</td>
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<td>11/26/15 - 11/27/15</td>
<td>Thanksgiving Holiday</td>
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**Manufacturing Engineering General Learning Outcomes**

The educational outcomes were derived from the Accreditation Board for Engineering and Technology (ABET) program education objectives, and are the skills students acquired by the time of graduation. It will be demonstrated that the student is:

1. is able to use knowledge of mathematics, basic sciences and engineering to analyze problems in manufacturing engineering,
2. is able to design and conduct experiments and interpret the results,
3. is able to design devices, systems or processes that meet given specifications,
4. is able to use computers and software for analysis, design and documentation,
5. is able to communicate ideas effectively in graphical, oral and in written media,
6. is able to function as a team member to solve engineering problems,
7. understands the professional responsibility of an engineer and how engineering solutions impact safety, economics, ethics, politics, society and cultural issues,
8. understands the need for life long learning to keep abreast of current practice.

**Manufacturing Engineering Specific Learning Outcomes**

Students graduating from the manufacturing engineering department will have proficiency in the areas of

- **A. materials and manufacturing processes**
  - A1. understands the effect of processes on the properties of materials,
  - A2. has the ability to design and conduct experiments to measure the performance of materials, components and systems, and to communicate results,
  - A3. has the ability to select and evaluate materials and specify manufacturing steps for manufacturing processes.

- **B. process and product engineering**
  - B1. has the ability to create and annotate two dimensional drawings, and generate three dimensional computer based solid models of components and assemblies,
  - B2. has the ability to design products, tooling or equipment,
  - B3. has the ability to design manufacturing process and specify the process plan.

- **C. manufacturing productivity and quality**
  - C1. has the ability to analyze and improve the methods used in the manufacture of products,
  - C2. has the ability to do designed experiments and apply statistical concepts of quality to all aspects of manufacturing.

- **D. manufacturing systems engineering**
  - D1. has the ability to build and analyze models of manufacturing systems,
  - D2. has the ability to design control systems for manufacturing,
  - D3. has the ability to establish systems to plan and control the manufacturing of products using modern methods.

**Student Learning Outcomes**

Students will be able to:
1. Review the application of statistical distributions to solve manufacturing engineering problems,
2. Review the selection and application of statistical inference,
3. Employ design of experiments methodology,
4. Choose the correct experimental design,
5. Appraise the effectiveness of SPC tools in improving quality,
6. Appraise the effectiveness of control charts for variables,
7. Analyze the state of statistical quality control using control charts for attributes,
8. Evaluate process and measurement system capability

### Contribution of Student Learning Outcomes to Program Educational Outcomes

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<th>Educational Outcomes</th>
<th>Student Learning Outcomes</th>
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