INSTRUCTOR INFORMATION

Instructor:         Dr. Doug Timmer
Office:              EENGR 3.258
Office phone:    956-665-2608
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Skype:              douglas.timmer@utrgv.edu

Course Schedule

Monday, Wednesday 8:00 - 9:15 am, EENGR 1.242

Office Hours

- Monday 10:00 - 11:30 am
- Tuesday 10:00 - 11:30 am
- Wednesday 10:00 - 11:30 am
- Thursday 10:00 - 11:30 am
- or by appointment

In office or by Skype

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>
</tr>
</thead>
<tbody>
<tr>
<td>In-class exams</td>
<td>30%</td>
</tr>
<tr>
<td>Final exam</td>
<td>15%</td>
</tr>
<tr>
<td>DOE Projects</td>
<td>15%</td>
</tr>
<tr>
<td>SPC Projects</td>
<td>15%</td>
</tr>
<tr>
<td>Homework</td>
<td>15%</td>
</tr>
<tr>
<td>Attendance</td>
<td>10%</td>
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</table>

**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 15% 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 two Statistical Process Control projects. Your project score is worth 15% 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 Projects are individual projects.

**Homework**

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

Online Practice Problems will be provided to help students review material from engineering statistics. The practice problems are untimed and can be attempted an unlimited number of times. The scores from the practice problems will not be used in calculating your MANE 4311 grade. For each set of practice problems, there is an accompanying Online Quiz. Students are allowed a single, 30 minute attempt for each quiz. The quiz questions were generated by the same program that created the online practice problems questions are essentially identical. The Online Quiz grade will count as a homework score.

**Attendance**

You are expected to exhibit professional behavior that includes being prepared for class and punctually attending each lesson. Attendance will be taken electronically, probably using Kahoot!

**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.

REQUERED 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. The IT department should announce during the Fall 2018 semester a method that students can install a copy of Minitab on their personal PC. When this information becomes available, I will release it to the class.

COURSE POLICIES

Students with Disabilities

Students with a documented disability (physical, psychological, learning, or other disability which affects academic performance) who would like to receive academic accommodations should contact Student Accessibility Services (SAS) as soon as possible to schedule an appointment to initiate services. Accommodations can be arranged through SAS at any time, but are not retroactive. Students who suffer a broken bone, severe injury or undergo surgery during the semester are eligible for temporary services.

Pregnancy, Pregnancy related, and Parenting Accommodations

Title IX of the Education Amendments of 1972 prohibits sex discrimination, which includes discrimination based on pregnancy, marital status, or parental status. Students seeking accommodations related to pregnancy, pregnancy-related condition, or parenting (reasonably immediate postpartum period) are encouraged to contact Student Accessibility Services for additional information and to request accommodations.

Student Accessibility Services:

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 ability@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 ability@utrgv.edu.

Sexual Harassment, 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 believes 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. Students who complete their evaluations will have priority access to their grades. Online evaluations will be available on or about:

- Module 1 October 4 – 10
- Module 2 November 29 – December 5
- Full Fall Semester November 15 – December 5

**Student Services**

Students who demonstrate financial need have a variety of options when it comes to paying for college costs, such as scholarships, grants, loans and work-study. Students should visit the Students Services Center (U Central) for additional information. U Central is located in BMAIN 1.100 (Brownsville) or ESSBL 1.145 (Edinburg) or can be reached by email (ucentral@utrgv.edu) or telephone: (888) 882-4026. In addition to financial aid, U Central can assist students with registration and admissions.

Students seeking academic help in their studies can use university resources in addition to an instructor’s office hours. University Resources include the Learning Center, Writing Center, Advising Center and Career Center. The centers provide services such as tutoring, writing help, critical thinking, study skills, degree planning, and student employment. Locations are:

- Learning center: BSTUN 2.10 (Brownsville) or ELCTR 100 (Edinburg)
- Writing center: BLIBR 3.206 (Brownsville) or ESTAC 3.119 (Edinburg)
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.

Course Schedule

<table>
<thead>
<tr>
<th>Aug. 27</th>
<th>Course Introduction</th>
<th>Aug. 29</th>
<th>Lecture 1: Chapter 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep. 3</td>
<td>Labor Day Holiday (no class)</td>
<td>Sep. 5</td>
<td>Lecture 2: Chapter 3</td>
</tr>
<tr>
<td>Sep. 10</td>
<td>Lecture 3: Chapter 3, DOE Project 1 Assignment</td>
<td>Sep. 12</td>
<td>Lecture 4: Chapter 4</td>
</tr>
<tr>
<td>Sep. 17</td>
<td>No lecture (out on ABET Visit)</td>
<td>Sep. 19</td>
<td>Lecture 5: Chapter 4</td>
</tr>
<tr>
<td>Sep. 24</td>
<td>Lecture 6: Chapter 4</td>
<td>Sep. 26</td>
<td>Lecture 7: Chapter 5</td>
</tr>
<tr>
<td>Oct. 1</td>
<td>Test 1 (Chapters 3-4)</td>
<td>Oct. 3</td>
<td>Lecture 8: Chapter 13</td>
</tr>
<tr>
<td>Oct. 8</td>
<td>Lecture 9: Chapter 13</td>
<td>Oct. 10</td>
<td>Lecture 10: Chapter 13, DOE Project 2 Assignment</td>
</tr>
<tr>
<td>Oct. 15</td>
<td>Lecture 11: Regression Review (Chapter 4)</td>
<td>Oct. 17</td>
<td>Lecture 12: Regression Review (additional notes)</td>
</tr>
<tr>
<td>Oct. 22</td>
<td>Lecture 13: Chapter 14</td>
<td>Oct. 24</td>
<td>Lecture 14: Chapter 14, SPC Project 1</td>
</tr>
<tr>
<td>Oct. 29</td>
<td>Lecture 15: Chapter 5</td>
<td>Oct. 31</td>
<td>Test 2 (Chapter 13 - 14)</td>
</tr>
<tr>
<td>Nov. 5</td>
<td>Lecture 16: Chapter 6</td>
<td>Nov. 7</td>
<td>Lecture 17: Chapter 6, SPC Project 2</td>
</tr>
<tr>
<td>Nov. 12</td>
<td>Lecture 18: Chapter 6</td>
<td>Nov. 14</td>
<td>Lecture 19: Chapter 7</td>
</tr>
<tr>
<td>Nov. 19</td>
<td>Lecture 20: Chapter 7</td>
<td>Nov. 21</td>
<td>Lecture 21: Chapter 7</td>
</tr>
<tr>
<td>Nov. 27</td>
<td>Lecture 22: Chapter 8</td>
<td>Nov. 29</td>
<td>Lecture 23: Chapter 8</td>
</tr>
<tr>
<td>Dec. 3</td>
<td>Lecture 24: ISO 9000, Chapter 2</td>
<td>Dec. 5</td>
<td>Review</td>
</tr>
<tr>
<td>Dec. 7-13</td>
<td>Final Exam</td>
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Important University Dates

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>8/27/2018</td>
<td>First day of classes</td>
</tr>
<tr>
<td>8/30/2018</td>
<td>Last day to add or register for Fall 2018 courses</td>
</tr>
<tr>
<td>9/3/2018</td>
<td>Labor Day Holiday</td>
</tr>
<tr>
<td>9/12/2018</td>
<td>Census Day</td>
</tr>
<tr>
<td>11/14/2018</td>
<td>Drop/Withdraw deadline</td>
</tr>
<tr>
<td>11/22/2018 - 11/24/2018</td>
<td>Thanksgiving Holiday</td>
</tr>
<tr>
<td>12/6/2018</td>
<td>Study (Dead) Day, no classes</td>
</tr>
<tr>
<td>12/7/2018 - 12/13/2018</td>
<td>Final Exams</td>
</tr>
<tr>
<td>12/14/2018 - 12/15/2018</td>
<td>Commencement Exercises</td>
</tr>
<tr>
<td>12/17/2018</td>
<td>Grades due by 3:00 pm</td>
</tr>
</tbody>
</table>

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