

IENG 213: Probability and Statistics

Course: IENG 213: Probability and Statistics

Semester: Spring 2011

Number of credit hours: 3

Description of the Course

Engineering Statistics. 3 Hr. PR: MATH 156. The use of basic statistical analysis in engineering decision making, including common statistical distributions encountered in engineering, test of hypotheses, confidence intervals, and introduction to simple linear regression.

Prerequisites: Math 156 (you really need to know calculus)

Course Instructor

Steven E. Guffey, PhD, Professor and IH Program Coordinator
IMSE Department, Room 353C MRB

Communications with the Instructor

I will frequently email students. I will generally send them only to your Mix account, as is University policy. If you don't use your mix, set up the mix account to forward to your preferred address. It is your responsibility to read your email.

Email: Steve.Guffey@mail.wvu.edu Note: do NOT use seguffey@gmail.com

Web: www.IndustrialVentilation.net
click on "For My WVU Students" then IENG 213

Contains Power Point files for each lecture, additional study materials, cheat sheets, statistical tables, tips, a few previous exams, schedule notes, and more. You may download them and print them to assist your note-taking in class. If it is not clear whether we will finish the current chapter and start a new one, bring both just in case.

Phone: 304-685-1298 (cell) Do not call in the interval from 9:00 to 1:00 on Tuesdays or Thursdays. Do not use my 293 number.

Please send emails rather than leaving voice mail.

Call my cell phone number if I am not in my office during posted office hours or in the unlikely event that I fail to show up for an appointment with you. Usually I am nearby dealing with some problem or another and will show up in minutes, but call me immediately if I am late to an appointment with you.

Office visits:

My office hours for IENG 213 are posted by my door

Other times by appointment (email greatly preferred).

If you drop by without an appointment, I will see you if at all possible, but we are likely to be interrupted frequently and I will answer my phone if it rings since I probably have asked for someone to call me during that period of time.

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Textbook for the course

It is very helpful to read the chapters in the book and to review the Powerpoint files before the class.

Title: Probability and Statistics for Engineers and Scientists, 8th Edition

Authors: Ronald E. Walpole
Raymond H. Myers
Sharon L. Myers
Keying Yee

Grading Elements and Weighting

• Tests (2), each counting 30%	60%
• Final (only partially cumulative)	30%
• Homework and Quizzes HW due next class unless specified otherwise Late HW penalized 10% per day Alternatively, missed or late HW and missed quizzes can be "made up" by taking a quiz prior to the next scheduled class. Schedule these makeup quizzes with the TA.	10%
HW solutions will be posted on my door.	
Total	100%

Course Contribution to Professional Component

Engineering Science – 100%, Engineering Design – 0%

Course Relationship to Undergraduate IE Educational Outcomes:

Outcome 1: Ability to use modern IE methods (i.e., statistics)

Key abilities -- Students will learn the bases of and the application of:

1. Random variables and probability distributions
2. Mathematical expectations
3. Confidence intervals
4. Hypothesis testing

Outcome 2: Ability to apply knowledge of math (i.e., calculus)

Key abilities -- Students will use calculus to compute expected values

Outcome 3: Ability to ... analyze and interpret data

Key abilities

1. Students will be able to compute summary statistics from experimental data
2. Student will be able to state null and alternate hypotheses for hypothetical experiments

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Method of Instruction

IENG 213 includes 3 hours of lectures each week of the semester, except for class times set aside for exams, pop tests, and review of homework.

Approximate Topical Schedule

Lecture Topic or Exam	Chap
Introduction to Statistics and Data Analysis	1
Probability	2
Random Variables and Probability Distributions	3
Mathematical Expectation	4
First Exam	
Some Discrete Probability Distributions	5
Some Continuous Probability Distributions	6
Fundamental Sampling Distributions and Data Descriptions	8
Second Exam	
One and Two Sample Estimation Problems	9
One and Two Sample Tests of Hypothesis	10
Review and course evaluation	
Third ("final") Exam (NOT cumulative per se)	

Pop Quizzes:

We need every minute of class, so I will enforce strict time limits on pop quizzes when we have them. If you are late to class, you will be required to stop whenever I ask all students to stop working. If you miss class for any reason or are too late to take the quiz, you get a zero on that day's pop quiz. You can "makeup" a missed pop quiz by taking a substitute quiz prior to the next class.

Homework:

Assignments are due the next class. Late HW can be made up prior to the next class by taking an extra pop quiz scheduled with the TA.

A correct answer to a multiple step problem will be given a zero if you do not show the work.

Identify your HW or Quiz when you turn it in. On the cover or first page, put:

- Your name
- Chapter of assignment
- Page numbers of the assignment

Put your initials or name on all subsequent pages

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Tests

Three major tests are given. They are not cumulative per se, but the knowledge you need to work later problems depends to some degree on what you have learned in previous sections.

Rules for receiving credit for responses on tests and exams:

- You must show work if more than one step is involved, whether the question explicitly asks you to show work or not. A solution of a multiple step problem that does not show the work correctly (or is too disorganized or messy to follow easily) will be given a zero even if the final answer happens to be correct.
- If the test asks your opinion, you must back up your opinion with statistical or logical proof. “Yes or no” answers without a correct explanation and proof generally will be given a zero.
- A written response that is difficult to follow because it is messy, disorganized, or otherwise poorly presented will be given zero credit.
- Presentations of two solutions will be given no credit unless one solution is marked through clearly and unambiguously.

Rules to avoid the appearance of cheating on tests and exams:

- During the test, the only things on your desk or within your reach or sight should be the test, authorized “cheat sheets” posted on my web site, a few sheets of blank paper, your calculator, and the statistical tables needed for the test. All other devices and materials are forbidden and will be considered a violation of class rules and as direct evidence of cheating or having prepared to cheat. That includes electronic devices other than a single calculator. An exception will be made for materials and devices left in closed backpacks, purses, and other closed carrying devices that substantially impede surreptitious access to their contents. No such carrying devices should be on any desk or left open for any reason. If you do not have a backpack or other suitable carrying device, you may bring unauthorized devices or materials to me at the front of the room before beginning to receive the test. If you need access to the contents of a purse or backpack (etc), raise your hand and obtain permission of the instructor before accessing the contents.
- Placing any forbidden materials or devices on or near your desk in a manner allowing access to them will be considered direct evidence of cheating. For example, placing problem solutions on the floor or any other nearby surface will be considered cheating whether you refer to them during the test or not.
- For the cheat sheets and the statistical tables, you may make (handwritten) notes on the printed side, but not the reverse side. Violating this rule will be considered direct evidence of cheating.
- You may use either statistical tables copied from the text or the tables I have posted to my website. You may not use a book or other reference that has the tables in it during the test. Violating this rule will be
- You may not communicate with anyone during a test or quiz other than the instructor or TA. Verbal, written, or electronic communications during a test of any kind will be considered direct evidence of cheating regardless of the subject or content of the communication.

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Comment on the class

Engineering statistics has been taught and is taught in virtually all engineering schools. It is required for a very good reason: interpreting statistical data is crucial to correct decision-making in a world filled with ever more uncertainty and change.

We must deliver more and more value to earn our pay, especially if we want highly paid positions. However, we can work only so many hours; the key to competitiveness is intellectual skills. The statistics classes you take here give you an extremely important skill that is increasingly central to making optimal decision. Statistical knowledge and skills can give you a crucial advantage over engineers who either did not take statistics or forgot it as quickly as possible.

The IMSE faculty is acutely aware of all this. That is why this course is considered to be one of the most important you will take. However, "if it were easy, everyone would be able to do it." This course is not easy for most students. It can't be and still be useful to you. Every topic covered in the class is there because of either accreditation requirements or to prepare you for a later course. Furthermore, the topics are the same as those covered in other engineering statistics courses across the country.

I am acutely aware of the importance of the course to your success. For that reason, I cover everything you must learn as thoroughly as time permits.

Statement on Attendance

I do not take attendance. It takes up far too much class time. My experience is that failing to attend class is generally followed by failing the class.

Statement on Makeup Exams

There will be two classes of makeup exams:

1. Makeup exam given within 3 school days to students who miss a scheduled exam due to severe, incapacitating medical problems, being out of town due to a death in the family, or attendance at a WVU sponsored event that they are required to attend (e.g., away soccer game if you are on the team; attendance at a professional conference that your department requires you to attend). In those cases, you must notify me by email or in person PRIOR to the time of the scheduled exam. If you will miss the exam due to a university official event, you must bring me a letter from the coach or faculty member who requires your attendance before the day of the exam. Even if you notify me in person you must also notify me by email and obtain a response from me (for my records).
2. Makeup exam given during the scheduled time for the final exam during finals week. This exam will cover all topics and problems from the exam(s) you missed plus the materials for the regular final exam. It will be taken in place of the final exam the rest of the class takes and will count for both the exam(s) you missed and the final exam. This exam can be taken by anyone who missed a regular exam or exams and did not qualify for or could not make it for any reason to the makeup exam given within 3 days after a regularly scheduled test. You may also request to take it to replace a poor grade on a regularly scheduled exam. If you do, you cannot change your mind after taking it.

If you have not taken an exam by the time mid-term grades are due, I will list an F or an I unless no exam grades are available for anyone in the class at that point. To receive an incomplete, you must first request an incomplete and obtain my agreement and the concurrence of the IMSE Chair and the CEMR Associate Dean.

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Statement on Cancelling Class

If the University cancels classes, then ours will not meet, either. Otherwise, I am extremely reluctant to cancel classes and have never done so in over 25 years as an academic. We have so much to cover that we cannot afford to reduce the number of classes we hold.

If I am ill and cannot attend, I will request that another faculty member teach the class for me and direct them to the lectures on my web site.

Please do not call me to ask if I intend to cancel.

Academic Dishonesty

Acts of academic dishonesty, such as cheating or plagiarism or assisting others in cheating, may result in a failing grade (F) and will be reported to the department Chair.

Statement on Social Justice

West Virginia University is committed to social justice. I concur with that commitment and expect to foster a nurturing learning environment based upon open communication, mutual respect, and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration.

Statement on Disability Accommodation

If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with Disability Services (293-6700).