IENG 213: Probability and Statistics

Course: IENG 213: Probability and Statistics CRN 11120

Semester: Fall 2009 T-R 1230-1245
Location: MRB 205

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, Professor and IH Program Coordinator
IMSE Department, Room 353C MRB

Communications with the Instructor

I will frequently email students. I will generally send it only to your Mix account, as is University policy. If you don't use that address, 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

I will email information to the class and to individuals from time to time using your **MIX** email address.

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

Contains student versions of 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: 304-293-9435

I often go for days without checking my voice mail, but I check my email several times a day. Send emails rather than leaving voice mail.

Cell phone: 304-685-1298

Use 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, only).

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.

Course Contribution to Professional Component

Engineering Science – 100%, Engineering Design – 0%

IENG 213: Probability and Statistics

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 computed 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

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.

Grading Elements and Weighting

• Tests (2), each counting 30%	60%
• Final (only partially cumulative)	30%
• Homework and Quizzes Due next class unless specified otherwise 20% penalty if one class period late 0% credit if later than one class period Diligent attempt earns ≥ half credit Solutions will be posted. Two lowest grades are excused.	10%
Total	100%

- 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 statistic 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 efficient engineering and productivity. It 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. 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.

IENG 213: Probability and Statistics

I am acute aware of the importance of the course to your success. For that reason, I cover everything you must learn as thoroughly as time permits. Like all other math classes, you can't develop facility without working problems. Since we cover a great many topics, that means we have a lot of homework.

- 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.

  We may also have "take-home pop quizzes".

- Homework:

  We will have a lot of homework every week. You NEED it to absorb the material. If you get behind it can be very difficult to catch up because we must cover a lot of material. Homework is intended to help you keep up. It does not serve that purpose if you copy others' homework or habitually do it late. Grading the homework is for your benefit because the grade motivates you to do the work.

  Due to pervasive copying of old homeworks from previous classes, I will sometimes post modified versions of the problems in the book to my website. Later, the detailed solutions will be posted on my door. Since the details of the solutions will be posted, it would be a waste of my grader's time to mark exactly where you went wrong when grading your homework or pop quiz.

  Rules:
  - Typically, three sections due per week
  - Assignments are due the next class. Zero credit for work submitted after the next class.
  - A correct answer to a multiple step problem will be given a zero if you do not show the work.
  - -- Solutions will be posted on my door for 3 school days beginning the next class day after they are due.
  - Identify your HW when you turn it in. On cover or first page, put:
    - Your name
    - Chapter of assignment
    - Page numbers of the assignment

    Put your initials or name on all subsequent pages
  - Note that the page numbers are sometimes off a bit because of changing text editions. If I assign "all odd problems," that means all odd problems on every page of the HW section up to the Review Problems section.

- 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:
  - Must show work if more than one step is involved. A correct final solution of a multiple step problem without showing the work will be given a zero.
  - If the test asks your opinion, you must back up your opinion with statistical proof. "Yes or no" answers without a correct explanation generally will be given a zero.
  - You may use only the authorized "cheat sheets" posted on my web site. You may make (handwritten) notes on the printed side, only.
  - You may use either copies of the statistical tables in the text or the tables I have posted to my website. You may write only on the printed side.

IENG 213: Probability and Statistics

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

Approximate Topical Schedule by Week

Week	Lecture Topic	Chap
1	Introduction to Statistics and Data Analysis	1
2-3	Probability	2
4	Random Variables and Probability Distributions	3
5	Mathematical Expectation	4
5	First Exam	
6-7	Some Discrete Probability Distributions	5
7-8	Some Continuous Probability Distributions	6
9-10	Fundamental Sampling Distributions and Data Descriptions	8
10	Second Exam	
11	One and Two Sample Estimation Problems	9
12-13	One and Two Sample Tests of Hypothesis	10
14-15	Simple Linear Regression and Correlation (time permitting)	11
15 (last class)	Review and course evaluation	
16	Third ("final") Exam (NOT cumulative per se)	

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.

IENG 213: Probability and Statistics

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).

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

In accordance with University policy, I am reluctant to allow taking an exam at any time other than the scheduled time. If a student is absent without an acceptable excuse on the day of a pop quiz, the student will receive a zero on that quiz. Pop quizzes will be given infrequently. A student who is tardy will NOT be given additional time to complete the quiz beyond the point other students are asked to stop working.

If you must miss a scheduled exam, you must obtain prior approval from me unless you are in a coma or otherwise incapable of calling, emailing, or otherwise getting in touch with me. Otherwise, it is highly likely that I will give you a zero on the test or a substantial reduction from your earned grade on the test.

I may not grant you approval to take the test late even if you request in advance. If I do not give you explicit approval to take it late and you do not take it at the scheduled time, you will receive a zero or a substantial reduction from your grade, depending on my view of the circumstances involved. Of course, I excuse absences due to sanctioned WVU events where your participation is required (e.g., as a member of a sport team or a meeting of a professional society).

In the unlikely event that I allow you to take the exam later than other students, it must be taken as soon as possible (e.g., later the same day or the next morning) unless I agree that it can be taken later than that.

Do NOT leave a message on my office voicemail. If at all possible, let me know by email unless you reach me directly on the telephone. It is your responsibility to reach me. If you try and fail repeatedly, contact Dr. Wafik Iskander, the Chair of IMSE and make your request to him. I will accept his judgment.

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.