

IENG 213 – Probability and Statistics for Engineers & Scientists

SPRING 2020

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<u>Office Hours:</u>	Wed. 10 am - Noon	Tue./Thur. 11 am – Noon

Description:

This course covers the use of statistical analysis in engineering decision making. Topics covered include basic statistical methods of describing data, common statistical distributions encountered in engineering, tests of hypotheses, and confidence intervals.

Course Objectives:

1. To understand basic methods of descriptive statistics and graphical presentations of data.
2. To learn the basic concepts of probability, discrete and continuous random variables, expected values, and joint probability distributions.
3. To be able to quantify the basic tools of statistical inference; point estimation, interval estimation, and hypothesis testing.

Course Outcomes: Students will learn how to analyze, interpret data and compute summary statistics from experimental data. They will also learn the bases and the application of random variables and probability distributions, mathematical expectations, confidence intervals, and hypothesis testing for hypothetical experiments.

Lectures: 8:00 am to 9:15 am; TR – 101 NRC-E

Textbook: Recommended Probability & Statistics for Engineers & Scientists, 9th Edition
Authors: Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye
ISBN 10: 0321629116, and ISBN 13: 978 – 0321629111

Class notes: Lecture videos, lecture notes, handouts, classwork (CW) and homework (HW). Grades will be available on eCampus. Please check your eCampus frequently.

Course Contribution to Professional Component: Engineering Science – 100%, Engineering Design – 0%

Grading Elements and Weighting:

<u>Performance:</u>	<u>Weighting:</u>	<u>Points:</u>	<u>Grades:</u>
Homework	10% (drop lowest 2)	90-100%	= A
Classwork	15% (drop lowest 2)	80-89%	= B
Exam 1	15%	70-79%	= C
Exams 2, 3 & 4	<u>20% each=60%</u>	60-69%	= D
	100%	<59%	= F

Teaching and Classroom Strategy

The teaching strategy for this section of IE 213 will be “Flip the Classroom”. This teaching technique inverts traditional teaching methods. Lectures are via “You Tube” videos, links are available on eCampus. Individual videos range from 3-20 minutes long, with most between 5-15 minutes. Lectures require multiple videos, with most homework assignments requiring you view 25-40 minutes of video. You can rewind, pause or advance. This will allow you to work at your own pace. You will also have a short homework assignment online (4-6 questions) that will be graded following the lecture video. Homework is administered via eCampus. **Homework turns off at 8:00 am, the day it is due. No late homework is accepted.** It is important, prior to attending class, that you view the video lectures and do the homework. This will prepare you for the team class work and in class problem solving. **Take notes from the videos and bring notes to class to help you with the class work.** The grading for homework will work as follows (lowest 2 homework grades will be dropped):

90 – 100%	= 100% credit for Homework
80 – 89%	= 90% credit for Homework
70 – 79%	= 80% credit for Homework
60 – 69%	= 70% credit Homework
50 – 59%	= 60% credit Homework
40 – 49%	= 50% credit Homework
< 40%	= whatever % it is

The classroom time will be used to answer questions, review homework problems, and work on in class assignments / problems to apply the concepts. You will need your notes from the videos, handouts given in class, pencils and a calculator for class. This structure is a significant change for most students. You will work in teams of 3/4. Teams may be preassigned. This type of learning environment engages students and can increase learning potential. It is important that you attend class and arrive to class on time. Classwork will be done in class, graded and count towards your overall grade. Classwork will not be accepted after class. If you are not present that day you will receive a zero. The lowest 2 classwork scores will be dropped. Unless otherwise designated, each student must turn in a classwork sheet, even if the work is as a team. **Teams CANNOT sign someone’s name that is not present in class, this is considered fraud or misrepresentation and will fall under Academic Integrity and Dishonesty (outlined below).**

Civility in the Classroom

In this course, you are expected to act in a manner consistent with the behavior expected in the professional workplace. Respect each other, come to class prepared, be supportive of others, be attentive, and contribute when appropriate. Civility is expected and assumed. In order for everyone to have the opportunity to maximize learning, inappropriate or disruptive behavior is prohibited and may result in a request to leave the classroom at a minimum.

Academic Integrity and Dishonest

The policy for academic integrity and dishonesty is updated on the following WVU website: <https://provost.wvu.edu/governance/academic-standards-resources/academic-integrity-policy> Students of West Virginia University are citizens of a broader academic community. As such, the University expects that every member of its academic community share its historic and traditional commitment to honesty, integrity, and the search for truth. To meet these standards, academic dishonesty will not be tolerated. The website defines academic dishonesty as

“plagiarism; cheating and dishonest practices in connection with examinations, papers, and/or projects; and forgery, misrepresentation, or fraud as it relates to academic or educational matters. ”Academic Dishonesty” in this class will result in the following sanction in the first instance:

- Plagiarism: Student will receive 0% on the assignment.
- Cheating: Student will receive a 0 on the assignment / exam.
- Forgery, misrepresentation, or fraud: F in the course.
- In addition, an Academic Dishonesty Form will be submitted through the department and college offices. Academic dishonesty in the second and following instances may receive more severe sanctions, which can include up to dismissal from an academic program.

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).

Statement on Attendance

Attendance is important to participate in the team classwork assignments (which are graded) and problem solving. If you have an emergency situation, please notify me before class if at all possible, or as soon as possible.

Exams and “In Class” Quizzes

Students must carry their WVU student identification card during exams. Formula sheets and Tables will be provided. “Stand alone” calculators will be needed and cannot be shared. Students must show all the necessary work in order to receive full or partial credits of a problem. **Students must not leave the room during an exam without the instructor’s permission.** Exams are timed. May replace the lowest exam score with the final exam if the final exam is higher.

Course Syllabus Modification

Attached is a tentative schedule. It may be modified as the semester progresses. Students will be notified of any changes.

Week	Date	TENTATIVE SCHEDULE		Chapters in book
		Lecture Topic		
WK1	Jan-14-2020	Syllabus & Intro to Statistics and Data Analysis		1
	Jan-16-2020	Intro to Statistics and Data Analysis		1
WK 2	Jan-21-2020	Probability		2
	Jan-23-2020	Probability		2
WK 3	Jan-28-2020	Probability		2
	Jan-30-2020	Random Variables and Probability Distributions		3
WK 4	Feb-4-2020	Random Variables and Probability Distributions		3
	Feb-6-2020	Random Variables and Probability Distributions/ Test Review		3
WK 5	Feb-11-2020	Exam 1		1,2,3
	Feb-13-2020	Mathematical Expectations		4
WK 6	Feb-18-2020	Mathematical Expectations		4
	Feb-20-2020	Discrete Probability Distributions		5
WK 7	Feb-25-2020	Discrete Probability Distributions		5
	Feb-27-2020	Continuous Probability Distributions		6
WK 8	Mar-3-2020	Continuous Probability Distributions		6
	Mar-5-2020	Continuous Probability / Test Review		6
WK 9	Mar-10-2020	Exam 2		4,5,6
	Mar-12-2020	Fundamental Sampling Distributions and Data Descriptions		8
SP Brk	Mar-17-2020	SPRING BREAK		
	Mar-19-2020	SPRING BREAK		
WK 10	Mar-24-2020	Fundamental Sampling Distributions and Data Descriptions		8
	Mar-26-2020	One and Two Sample Estimation Problems		8
WK 11	Mar-31-2020	One and Two Sample Estimation Problems		9
	Apr-2-2020	One and Two Sample Estimation Problems		9
WK 12	Apr-7-2020	One and Two Sample Estimation Problems		9
	Apr-9-2020	One and Two Sample Estimation Problems/ Test Review		9
WK 13	Apr-14-2020	Exam 3		8,9
	Apr-16-2020	One and Two-Sample Tests of Hypothesis		10
WK 14	Apr-21-2020	One and Two-Sample Tests of Hypothesis		10
	Apr-23-2020	One and Two-Sample Tests of Hypothesis		10
WK 15	Apr-28-2020	One and Two-Sample Tests of Hypothesis		10
	Apr-30-2020	Final Exam Review		10
16	May-5-2020	Final Exam 8-10 AM		10