IE 323 – Statistical Methods in Industrial Engineering

Harold and Inge Marcus Department of Industrial and Manufacturing Engineering
The Pennsylvania State University, University PA

CLASSROOM: Earth and Eng Sciences 119 **MEETING TIME**: TuTh 10:35AM - 11:50AM

INSTRUCTOR: Hui Yang, Ph.D.
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OFFICE: 221 Leonhard Building
OFFICE HOURS: *TuTh 1:30pm - 2:30pm or by appointment*

GRADER: Chen Kan
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REUIRED TEXTBOOK:
Probability and Statistics for Engineers & Scientists by Walpole, Myers, Myers and Ye (**Ninth** Edition)

PREREQUISITE: IE322 Probabilistic Models in Industrial Engineering

COURSE OUTCOMES:
2.3 Ability to apply statistical concepts to solve real life problems, such as hypotheses testing, design of experiments and statistical quality control methods including process capability and control charts.
4.2 Demonstrate knowledge of contemporary issues: six sigma quality principles.

MAJOR TOPICS:

Topic	Minimum Reading Assignment
Random sampling and sampling distribution	Ch. 8, 8.1 thru 8.8
One- and two-sample Estimation problems	Ch. 9, 9.1 thru 9.13
One- and two-sample test of hypothesis	Ch. 10, 10.1 thru 10.11
Simple linear regression	Ch. 11, 11.1 thru 11.12
One-factor experiments	Ch. 13, 13.1 thru 13.3, and 13.6
Factorial experiments (two or more factors)	Ch. 14, 14.1 thru 14.3
2k Factorial Experiments	Ch. 15, 15.1, 15.2 and 15.4
Statistical quality control	Ch. 17
Control chart for variables	Ch. 17.1 thru 17.4
Control chart for attributes	Ch. 17.5 and 17.6
Gage R & R Studies and Six Sigma Concept	

GRADING POLICY
Quiz/Homework – 30%
Exam I – 35%
Exam II – 35%
Final Exam – 35%

The top two scores from the three exams will be added to and the total quiz/homework score to obtain the total grade for the course (out of a total of 100 pts). Exam dates will be announced as the course progresses. Final grade will be determined based on the student performance in different evaluation elements – as shown above. No make-up exams unless previous arrangements have been made. Students will be expected to attend class and prepare assignments. Habitual failure to do so will result in a reduced grade. An incomplete grade will only be given when a student misses a portion of the semester because of illness or accident. Cheating on examinations, plagiarism and other forms of academic dishonesty are serious offenses and may subject the student to penalties ranging from failing grades to dismissal.

Grading scale will be used: A: 90+; B: 80+; C: 70+; D: 60+, F: <60

CLASS POLICY

- Homework problem sets will be assigned during the semester. **Please use the assignment page as the cover page of your homework submission**. Homework solutions should be written neatly, papers **stapled**, and all steps **must** be shown clearly for full credit. Assignments not meeting these specifications will not be accepted. The back of your textbook contains the answers to the odd-numbered problems in the book.

- Homework is due one week after it is assigned. No late homework will be accepted. **Homework will be collected at the beginning of class on the assigned due date.** If you do not hand in your homework **on the assigned due date** it will be considered late. If you arrive late to class, please take a seat and you may hand in your homework at the end of the class. Please do not disrupt the class by walking up front and placing it on my desk. Please do not slide assignments under my office door and do not leave assignments on the TA's desk. At the end of the semester, the lowest assignment grade will be dropped.

- **Attendance:** Class attendance is strictly required. I will take attendance periodically (ROLL CALL) during the course of the semester. An extra 2 points will be added to the final grade for those whose ROLL CALL rate is greater than 80% through the semester. In the event of extenuating circumstances, please submit documentation (printed, signed, and dated by students and relevant authorities) to the instructor at least two days ahead of the class for approval. If it is not a university excuse, it will not be accepted. Dropping an email to me without any documentation will not be accepted.

- During class time, please **turn** your cell phones to **SILENT/VIBRATION** mode.

- Always bring your textbook to class. Also bring your calculator, notebook, pencils/pens, and eraser.

- ***Exams must be taken on the scheduled exam dates.*** Students are required to arrange with the instructor in advance for a make-up exam in the event of extenuating circumstances that prevent them from taking the exam as scheduled. In the event of an unforeseen emergency that prevents the student from taking the exam as scheduled, the student must provide documentation to the instructor before a make-up exam can be arranged. ***Anyone missing exams without notifying me ahead of time (and/or for a reason not deemed justifiable) will not be able to make it up.***

- There will be a review session, in class, before the exam. Exams will be closed book, closed notes. One-sided 8 ½ x 11 formula sheet can be used. Please be sure to bring your calculator to the exam. There will be absolutely no sharing among students of formula sheets or calculators. ***No cell phone, computer or laptop is allowed in this exam.***

- If you believe there was an error in the grading of an exam, you may submit the entire exam for a regrade. This must be done ***within one week*** from the date the exam was returned. The entire exam will be regraded, so that you may gain, or lose, points by resubmitting.

COMMUNICATION AND INSTRUCTION VIA CANVAS

Communication in the course will be through official electronic means: PSU assigned e-mail address and the course website in CANVAS (https://psu.instructure.com/). Students are responsible for all information conveyed during class and on CANVAS. It is the student's responsibility to make sure they are receiving their official PSU email and checking course updates in the CANVAS website.

To access CANVAS, go to: https://psu.instructure.com/

Go to Dashboad and then click on IE 323, Section 02: STAT METHODS IN IE. Check this website frequently for: Course syllabus, important announcements, homework sets, lecture notes, emails, grades, and additional resources.

INSTRUCTOR'S COMMITMENT

You can expect your instructor to be courteous, punctual, well-organized, and prepared for the lecture and other class activities; to answer questions clearly; to be available during office hours or to notify you beforehand if he is unable to keep them; and to grade uniformly and consistently according to the posted guidelines.

STUDENTS WITH DISABILITIES SERVICES

Penn State welcomes students with disabilities into the University's educational programs. If you have a disability-related need for reasonable academic adjustments in this course, contact the Office for Disability Services (ODS) at 814-863-1807 (V/TTY). For further information regarding ODS, please visit the Office for Disability Services Web site at http://equity.psu.edu/ods/.

In order to receive consideration for course accommodations, you must contact ODS and provide

documentation (see the documentation guidelines at http://equity.psu.edu/ods/guidelines/documentation-guidelines). If the documentation supports the need for academic adjustments, ODS will provide a letter identifying appropriate academic adjustments. Please share this letter and discuss the adjustments with your instructor as early in the course as possible. You must contact ODS and request academic adjustment letters at the beginning of each semester.

ACADEMIC INTEGRITY

Violations of academic honesty will be dispatched in accordance with the university policy (http://www.psu.edu/oue/aappm/G-9-academic-integrity.html).

***My expectation*:**

- You should always put forth work that is an honest representation of your learning on the subject matter.
- **Each assignment done for this class is expected to be an individual effort.** Before an exam, students often ask me 'What is the best way to study for this exam?' My answer is always the same, 'Practice!' I truly believe that in order to fully understand this material, you must work out the problems on your own. You do not have to 'get' how to do a problem right away; let your mind go through the thinking process. For any problem assigned, we have probably done something exactly or very similar to it in class. Go through your notes and try to understand what needs to be done and why. The more problems you do, the better you will get at solving these problems. With practice, doing the calculations become second nature, so that you will not only know how to do the calculations without much thinking, but you will automatically get faster at doing them, as well.

***What if you cannot solve the problem on your own*?**

- The key is to start the assignments as early as possible so that you can get help from the TA or myself, if needed.
- My first preference is for you to come and see either the TA or myself during office hours. We can help you understand the concepts, and you can have confidence that we will steer you in the right direction (not always the case when you rely on your friends, who are also learning the concepts for the first time).
- It is okay to discuss the *approach* with other students and why the problem should be solved using that particular method. However, this is where the discussion should end. All calculations and conclusions should be your own.

IMPORTANT DATES

Classes Begin	Monday	January 9
Regular Drop - Deadline	Saturday	January 14 at 11:59 p.m. (ET)
Regular Add - Deadline	Sunday	January 15 at 11:59 p.m. (ET)
Late Drop Begins	Sunday	January 15
Martin Luther King Day - No Classes	Monday	January 16
Final Exam Conflict - Filing Period	Monday - Sunday	February 13 - March 5
Spring Break - No Classes	Sunday - Saturday	March 5 - 11
Late Drop - Deadline	Friday	April 7
Withdrawal - Deadline	Friday	April 28 at 5:00 p.m. (ET)
Classes End	Friday	April 28
Study Days	Saturday - Sunday	April 29 - 30
Final Exams	Monday - Friday	May 1 - 5
Commencement	Friday - Sunday	May 5 - 7

Good luck and have a great semester!