ESI 6325: Applied Probability Methods in Engineering (APME)

Fall 2016

Department of Industrial and Systems Engineering

University of Florida

Instructor: Sepehr Nemati Proon
Email: snematiproon@ufl.edu
Office Hours: Mondays (1:00 pm to 3:00 pm) - Office: 472 Weil Hall

TA: Kezhuo Zhou
Email: zhoukezhuo@ufl.edu
Office Hours: Wednesdays (1:00 pm to 3:00 pm)

Class Meeting Times and Location: T 8-9, R 9, CSE E107

Course Catalog Description: *Prereq: Calculus, differential equations, undergraduate probability and statistics.* Applied probability theory and statistics, reliability engineering, quality control, forecasting, Markov processes, and queuing theory.

Required Course Materials
- Hayter, 2007, *Probability and Statistics for Engineers and Scientists, 3rd Edition*, Duxbury (Thomson Brooks/Cole), ISBN #0-495-10757-3 (note: the 4th edition is available and is certainly acceptable; the homework problems are the same in both edition, except where noted on the assignments)
- This course packet consists of Chapters 13, 17, and 20 of the book "Operations Research, 4th ed," by W.L.Winston, 2004 Duxbury (Thomson Brooks/Cole), ISBN #0-534-38058-1, or Chapters 2, 5, and 8 of the book "Introduction to Probability Models, 4th ed.," by W.L. Winston, 2004 Thomson Brooks/Cole, ISBN #0-534-40572-X

Course Assessment
- Homework: 10%
- Two Quizzes: 25% each
- Final Exam: 40%

Course Objectives
By the end of this course you should have a solid understanding of the fundamental methods of probability and statistics, as well as the use of these methods in foundational applications areas used in Industrial and Systems Engineering, including:
- Reliability
- Statistical Quality Control

- Markov Chains
- Queuing Analysis

Course Topics
1. Review of probability
(HAYTER CHAPTERS 1-6)
      a. Probability laws (conditioning, Bayes' theorem, total probability, etc.)
      b. discrete probability distributions
      c. continuous probability distributions
2. Statistical sampling and hypothesis testing
(HAYTER CHAPTERS 7-10)
      a. sampling distribution
      b. single sample hypotheses
      c. two-sample hypotheses: independent and pairwise
      d. testing on mean
      e. contingency-table tests
      f. goodness-of-fit tests
3. Regression analysis
(HAYTER CHAPTERS 12-13)
      a. simple linear regression
      b. hypothesis testing
      c. correlation analysis
      d. multiple linear regression
      e. multicollinearity
      f. model adequacy
4. Reliability
(HAYTER CHAPTER 17)
5. Markov chains
(WINSTON CHAPTER 5)
      a. modeling
      b. classification of states
      c. limiting behavior

Exam Grading Appeals: every effort will be made to ensure that grading is as objective and fair as possible. If you believe that there is an error in the grading, please submit, in writing, an appeal within one week of your exam being returned. However, please be advised that if you submit such an appeal, the entire exam will be re-graded to ensure that all parts are properly graded. As such, your grade on the exam could increase or decrease based on the secondary grading.

Make-up Exam Policy: You are expected to be present without exception and to plan any travel around these dates accordingly. Medical emergencies are of course excluded if accompanied by a doctor's note. A note indicating that you were seen at the health center the day of the exam is not sufficient documentation of a medically excused absence from an exam. The note must say that you were medically unable to take the exam. If you fail to take the exam on the assigned day and do not have a valid excuse, there will be no make-up exam and you will be given a zero (0) on the exam. Employment interviews, employer events, weddings, vacations, etc. are not excused absences.

Honesty Policy: All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others. Any form of cheating will be penalized.

Accommodation for Students with Disabilities: Students requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation. UF Counseling Services: Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

- UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
- Career Resource Center, Reitz Union, 392-1601, career and job search services.

Software Use: All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Note: Please notify that the course syllabus is subject to change during the semester. Please make sure you follow the course announcements tentatively.