

**Klipsch School of Electrical and Computer Engineering
College of Engineering
New Mexico State University**

**EE 210: Engineering Analysis I, Section 1
Spring 2014**

Class Schedule: MWF 10:30-11:20 AM

Class Location: Thomas & Brown, Rm 204

Instructor:

Dr. Charles (Chuck) Creusere

Room 160D Goddard Annex

Phone: 646-3919

email: cCreuser@nmsu.edu

Office hours: Monday 9-10AM, Tuesday, 9-10 AM or by appointment.

Course Description:

This is a sophomore-level undergraduate course dealing with some basic theoretical concepts in engineering math and using Matlab to apply these concepts in practice. The theoretical topics to be covered are linear algebra (matrix and vector mathematics) and probability theory (including random variable and random processes). Student will learn the Matlab programming/analysis as part of this class, using it to apply the theoretical concepts learned to practical applications.

Prerequisites: C or better in EE161 and MATH 192G

Class Type: This is a required class in the EE program.

Textbooks:

Custom Textbook (available from bookstore): E. Kreyszig, *Linear Alg & Probability NM State*, John Wiley & Sons, Inc., 2012, ISBN: 9781119934899. This custom text contains Chapters 7, 8, 20, 24, 25, and Appendix 2 from E. Kreyszig, *Advanced Engineering Mathematics*, 10th edition, John Wiley & Sons, Inc., 2011, ISBN: 9780470458365.

A. Gilat, *MATLAB an introduction with applications*, 4th Ed., John Wiley & Sons. Inc., 2011.

Other Useful References (not required):

R. D. Yates and D. J. Goodman, *Probability and Stochastic Processes: A friendly introduction for electrical and computer engineers*, John Wiley & Sons. Inc., 2005.

Software:

MATLAB, (available in T&B labs). Purchase of MATLAB is optional.

Online Resources: Solutions and ancillary information will be posted on Canvas.

Course objectives:

- Perform vector and matrix operations, including matrix inversion, eigen analysis, finding basis and dimension of vector spaces and rank of a matrix, and solving a set of linear equations.
- Calculate probabilities using probability mass, density, and cumulative distribution functions for single and multiple, discrete and continuous random variables, and relate them to electrical engineering applications.

- Perform simple parameter estimation, such as finding sample mean and variance, and relate to confidence intervals.
- Describe random processes in the context of signal processing and communications systems problems.
- Use MATLAB to solve problems involving linear algebra and probability, including designing and performing simple numerical experiments.

Specific goals for the course:

a. specific outcomes of instruction, ex. the student will be able to explain the significance of current research about a particular topic: This course provides a foundation in basic linear algebra and probability theory and stochastic processes within the electrical engineering curriculum. After completing the course, the student will be able to apply linear algebra and probability concepts to solve electrical engineering problems and effectively use Matlab when needed.

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course: The course objectives are listed below showing connections to student outcomes:

1. Perform vector and matrix operations, including matrix inversion, eigenanalysis, finding basis and dimension of vector spaces and rank of a matrix, and solving a set of linear equations. (Student outcome: 1, 5; ABET: 3a, 3e)
2. Calculate probabilities using probability mass, density, and cumulative distribution functions for single and multiple, discrete and continuous random variables, and relate them to electrical engineering applications. (Student outcome: 1, 11; ABET: 3a, 3k)
3. Perform simple parameter estimation, such as finding sample mean and variance, and relate to confidence intervals. (Student outcome: 1, 11; ABET: 3a, 3k)
4. Describe random processes in the context of signal processing and communications systems problems. (Student outcome: 1; ABET: 3a)
5. Use MATLAB to solve problems involving linear algebra and probability, including designing and performing simple numerical experiments. (Student outcome: 2, 5, 11; ABET: 3b, 3e, 3k)

Contributions of EE210 to Meeting the Professional Component

This course provides a foundation in basic linear algebra and probability theory and stochastic processes within the electrical engineering curriculum. It is considered an engineering topics course in the professional component. One focus area in our study will be on applying the linear algebra and probability concepts to solving problems using Matlab.

Relationship of the course to program objectives: EE210 teaches students through reading, homework problems and Lab exercises to

- learn probability and statistics and apply these concepts to electrical engineering problems.
- use computers to solve electrical engineering problems.
- design and conduct experiments as well as to analyze and interpret data.
- use the techniques, skills, and modern engineering tools necessary to engineering practice.
- identify, formulate, and solve engineering problems.
- apply knowledge of mathematics, science and engineering.

Grading:

Quizzes: There will be Canvas-based quizzes most weeks. They will automatically appear on the Blackboard calendar and you will generally have two days to do each quiz. The quizzes are worth a combined 15% of the final class grade.

Challenge Quizzes: Canvas-based, short timeline quizzes based on in-class example problems. Combined, they are worth 5% of the class grade.

Homeworks: There will be weekly homework assignments **which are always due at the start of class.** They are worth 10% of the final grade. Late assignments will not be accepted.

Labs: The laboratory component of the class will be worth 20% of the final class grade.

Exam: There will be two midterm exams worth a total of 30% of the final grade. Dates: TBD.

Final: The final, comprehensive examination is scheduled for May 5, 2014 from 10:30AM-12:20PM. Worth 20% of the final grade.

Re-grading: If a student feels that the grading on any assignment or exam is in error, they must bring the problem to the instructor's attention within 1 week of receiving the graded assignment back from the instructor.

Policies:

I highly encourage you to discuss homeworks and projects with either myself or your peers. This discussion could include among other things, various approaches to a homework problem, algorithms for a software project, programming tips, and various theoretical insights. Be aware, however, that all submitted solutions to homeworks and projects must be written or coded (in the case of software) by the individual. There is to be no "sharing" of solutions. Any plagiarism or cheating will result in an automatic F in the course.

No late exam will be given. If a student misses an exam due to circumstances beyond the student's control, e.g., medical, a valid excuse must be presented to participate in a make-up exam. No make-up quizzes are available for any of the missed quizzes. If the missed quiz is due to any valid reason, the student's quiz score over the entire semester will be re-scaled to account for this miss. No more than three misses can be compensated for under any circumstances. If a student decides to stop coming to class and participating in the homework and/or exams, the student WILL NOT automatically be dropped. The student may receive a failing grade in the course. Homework problems must be answered in the order they are assigned. Out of order answers will not be graded. If a student joins the class late due to late registration or other reasons, the student will be fully responsible for the 2 missed classes and homework and other deadlines. No extension on homework, essays or projects can be given to such students simply on the ground that they joined late or they were not aware of the requirements.

The final grading: 90% and above: A, 80% and above but less than 90%: B, 70% and above but less than 80%: C, 60% and above but less than 70%: D, less than 60%: F. The instructor reserves the right to make minor adjustments on the score requirements for any of the grades, and may award bonus points (maximum up to 5) to deserving students for significant improvement and effort.

Calculator policy:

There are restrictions on the types of calculators that can be used in exams. Students may use one of the calculators approved by NCEES as outlined in the departmental calculator policy. Some or all of the exams may not allow the use of any calculator at all.

Rescheduled Classes:

There may be rescheduled classes. Classes will be made up either in the evenings or on weekends.

EEO/ADA Information:

Feel free to call Jerry Nevarez, Director of Institutional Equity, at 505-646-3635 with any questions you may have about NMSU's Non-Discrimination Policy and complaints of discrimination, including sexual harassment.

Feel free to call Michael Armendariz, Coordinator of Services for Students with Disabilities, at 505-646-6840 with any questions you may have on student issues related to the Americans with Disabilities Act (ADA) and/or Section 504 of the Rehabilitation Act of 1973. All medical information will be treated confidentially.

Prepared by: C. Creusere, 01/6/14