Fall 2015

ENEE 3572

Edit J. Bourgeois

University of New Orleans

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Electrical Engineering 3572 - 001
Probabilistic Methods for Signal and System Analysis
Fall 2015

General Information
Dr. Edit J. Kaminsky Bourgeois  
ejbourne@uno.edu
Professor and Associate Dean  
http://fs.uno.edu/ejbouge
Room EN 846  
Tel: 504.280.5616
Classes: Tuesdays and Thursdays from 11:00 to 12:15 in EN 321
Office hours: Tuesdays from 09:30 to 10:45 and 15:00 to 16:30, and Fridays from 15:00 to 16:30.
Last day to drop (no W): 08 September.  
Final day to drop (W): 14 October
Credits: Three (EE).
Pre-requisite: ENEE 3530


Description:
Fundamental probabilistic and statistical methods for the analysis of signals and systems.

Grading Information:
Test 1 25 %  
Test 2 25 %  
Homework 10 %  
Class participation 05 %  
Final Examination 35 %

Notes: All tests are ‘closed-book’. Tables and formulas are provided by instructor.

The course grade is ‘curved’ at the end, based on mean and standard deviation, and breaks between grades so that two very similar numerical grades don’t end up with two different letter grades. The assigned letter grade will most often be the standard 10-point scale, but a few will end up being better than this (never worse): A for (90-100), B for (80-90[, C for (70-80[, D for (60,70[, and F for (0,60[.

Syllabus:
INTRODUCTION: Introduction to course. Random signals and systems, statistics, probability, applications.
PROBABILITY: Set theory, probability, conditional probability, independence, Bayes’s rule.
RANDOM VARIABLES (1-D): Discrete random variables, continuous random variables, pdf, CDF, expectation and moments, central limit theorem, functions of a random variable.
SEVERAL RANDOM VARIABLES (N-D): Multivariate probability distributions, marginal and conditional probability, independence, expectation and moments, functions of random variables.
ELEMENTS OF STATISTICS: Sampling, inferences, parameter estimation, hypothesis testing.
RANDOM PROCESSES: Characterization and classification of random processes, correlation.
POWER SPECTRUM: Power spectral density, estimation.
LINEAR SYSTEMS WITH RANDOM INPUTS: System analysis, time-domain analysis, frequency-domain analysis, noise.
OPTIMAL LINEAR SYSTEMS: System synthesis, signal-to-noise ratio, mean-squared error, matched filtering, Wiener filtering.

Computer Use
Matlab will be used extensively.

Attendance:
Students are required to attend all lectures. Foreseen absences must be approved in advance. Exceptions due to emergencies shall be examined on a case-by-case basis. Attendance is required but not sufficient for participation.

Student Learning Outcomes
After successfully completing this course, students will be able to:

- Understand probability and set theory and compute probability of events
- Understand and compute conditional probability and Bayes’s rule
- Understand random variables (continuous and discrete)
- Analyze systems with random inputs
- Characterize random processes in the time domain
- Characterize random processes in the frequency domain
- Design Wiener and matched filters.
- Use the appropriate tools (theory, models, and techniques) to analyze problems with uncertainty.
- Apply concepts in statistics, such as mean, variance, and sampling.

Student Conduct
Students are expected to behave professionally, pay attention, be awake paying attention, and not conversing in class; cell phones should be silenced; instructions should be followed and time should not be wasted. All students should arrive before the starting time of 11:00 and leave once class is dismissed so as not to disturb the class.

Tentative Dates
Notifications of due dates and test dates will be posted on Moodle and written on the board well ahead of the due dates. The dates below are tentative and subject to change:

- Homework: due about every two weeks, starting with the first homework due on the second week of class.
- Test 1: 3 October 2015 (tentative)
- Test 2: 5 November 2015 (tentative)
- Final exam: Tuesday, December 8, from 10:00 to 12:00 (firm date).
University Policies

Academic Integrity
Academic integrity is fundamental to the process of learning and evaluating academic performance. Academic dishonesty will not be tolerated. Academic dishonesty includes, but is not limited to, the following: cheating, plagiarism, tampering with academic records and examinations, falsifying identity, and being an accessory to acts of academic dishonesty. Refer to the Student Code of Conduct for further information. The Code is available online at http://www.studentaffairs.uno.edu.

Accommodations for Students with Disabilities
It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities should contact the Office of Disability Services as well as their instructors to discuss their individual needs for accommodations. For more information, please go to http://www.ods.uno.edu.
Important Dates*
Last day to adjust schedule w/out fee..........................08/18/2015
Semester Classes Begin ........................................08/19/2015
Last day to adjust schedule w/fee, or withdraw with 100% refund..................08/25/2015
Last day to apply for December commencement ...09/25/2015
Final day to drop a course or resign ......................10/14/2015
Mid-semester examinations .....................................10/05-10/09/2015
Final examinations ...............................................12/07-12/11/2015
Commencement ..................................................12/18/2015
*Note: check Registrar’s website for Saturday and A/B sessions, and for items not listed here: http://www.registrar.uno.edu

Fall Semester Holidays
Labor Day ..............................................................09/07/2015
Mid-semester break ..............................................10/15-10/16/2015
Thanksgiving ........................................................11/26-11/27/2015

Withdrawal Policy – Undergraduate only
Students are responsible for initiating action to resign from the University (withdraw from all courses) or from a course on or before dates indicated in the current Important dates calendar. Students who fail to resign by the published final date for such action will be retained on the class rolls even though they may be absent for the remainder of the semester and be graded as if they were in attendance. Failure to attend classes does not constitute a resignation. Check the dates on the Registrar’s website, http://www.registrar.uno.edu. Please consult The Bulletin for charges associated with dropping and adding courses.

Incomplete Policy – Undergraduate only
The grade of I means incomplete and is given for work of passing quality but which, because of circumstances beyond the student’s control, is not complete. The issuance of the grade of I is at the discretion of the faculty member teaching the course. For all graduate and undergraduate students, a grade of I becomes a grade of F if it is not converted before the deadline for adding courses for credit (as printed in the Important Dates Calendar) of the next regular semester including summer semester.

Repeat Policy
When a student is permitted to repeat a course for credit, the last grade earned shall be the one which determines course acceptability for degree credit. A student who has earned a C or better in a course may not repeat that course unless, (1) the catalog description indicates that the course may be repeated for credit, or (2) the student’s Dean gives prior approval for documented extenuating circumstances.

Graduate Policies
Graduate policies often vary from undergraduate policies. To view the applicable policies for graduate students, see the Graduate Student Handbook:

Academic Dishonesty Policy

Safety Awareness Facts and Education
Title IX makes it clear that violence and harassment based on sex and gender is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here:
http://www.uno.edu/student-affairs-enrollment-management/

UNO Counseling Services and UNO Cares

UNO offers care and support for students in any type of distress. Counseling Services assist students in addressing mental health concerns through assessment, short-term counseling, and career testing and counseling. Find out more at http://www.uno.edu/counseling-services/. First-year students often have unique concerns, and UNO Cares is designed to address those students succeed. Contact UNO Cares through http://www.uno.edu/fye/uno-cares.aspx.

Emergency Procedures
Sign up for emergency notifications via text and/or email at E2Campus Notification: http://www.uno.edu/ehso/emergency-communications/index.aspx. All emergency and safety procedures are explained at the Emergency Health and Safety Office: http://www.uno.edu/ehso/.

Diversity at UNO
As the most diverse public university in the state, UNO maintains a Diversity Affairs division to support the university’s efforts towards creating an environment of healthy respect, tolerance, and appreciation for the people from all walks of life, and the expression of intellectual point of view and personal lifestyle. The Office of Diversity Affairs promotes these values through a wide range of programming and activities.
http://diversity.uno.edu/index.cfm

Learning and Support Services
Help is within reach in the form of learning support services, including tutoring in writing and math and other supplemental instruction. Visit the Learning Resource Center in LA 334, or learn more at http://www.uno.edu/lrc/

Affirmative Action and Equal Opportunity
UNO is an equal opportunity employer. The Human Resource Management department has more information on UNO’S compliance with federal and state regulations regarding EEOC in its Policies and Resources website: http://www.uno.edu/human-resource-management/policies.aspx