ESE 306

Random Signals and Systems

1. Course Staff and Office Hours

Instructor: Ji Liu
Ji.Liu@stonybrook.edu
211 Light Engineering

Office Hours: Monday and Wednesday, 6:05pm to 7:25pm
Other hours by appointment

TAs: To be announced

Office hours and locations may change. Please check Blackboard for most up-to-date information.

2. Course Description

The course aims to introduce students to basic concepts of probability theory and random processes.

Pre- or Corequisite: Calculus

Credits: 4

3. Textbook

- Lecture Slides

- "Probability and Stochastic Processes", R.D. Yates and D.J. Goodman, John Wiley and Sons, Inc, 2014

4. Assignments

- Problem sets will be assigned on an approximately every-other-week basis, and will not be graded.

- There will be 6 in-class quizzes held roughly every-other week; these will be announced the lecture prior to the quiz date (makeups only if prior notification of valid excuse provided).

5. Grading

Your grade will be based on homework assignments, two midterm exams, and a final examination.

Quizzes	20%
Project	20%
Midterm Exam 1	10%
Midterm Exam 2	20%
Final Exam	30%

6. Topics

Basic Concepts of Probability: Probability Axioms, Conditional Probability, Independence, Bayes Theorem

Discrete Random Variables: Probability Mass Function and Cumulative Distribution Function, Functions of Random Variables; Bernoulli, Binomial, Poisson and Geometric Random Variables, Expectations of Random Variables

Continuous Random Variables: Probability Density Function and Cumulative Distribution Functions, Functions of Random Variables, Uniform, Exponential, Gaussian, Beta and Gamma Distributions, Expectations of Random Variables

Jointly Distributed Random Variables: Joint Cumulative Distribution Functions, Joint Probability Mass Functions, Joint Probability Density Functions, Conditional Distributions, Independence, Sums of Random Variables

Random Vectors: Probability Models of N Random Variables, Marginals, Independence, Correlation Matrices, Gaussian Random Vectors

Stochastic Processes: Poisson Process, Brownian motion, Gaussian Processes, Stationary Processes

Random Signal Processing: Linear Filtering, Power Spectral Density, Frequency Domain Filter Relationships

Statistical Inference: Hypothesis Testing, Point Estimates, Confidence Intervals

7. Academic Honesty

Any academic dishonesty on a written homework or lab will result in a zero grade for the assignment for all parties involved.

All exam work must be entirely your own with no collaboration or outside materials/information. Any academic dishonesty on the midterm exams or the final exam will result in failing the course. The case will be submitted to the College of Engineering's Committee on Academic Standing and Appeals.

8. Electronic Communication Statement

Email and especially email sent via Blackboard (http://blackboard.stonybrook.edu) is one of the ways the faculty officially communicates with you for this course. It is your responsibility to make sure that you read your email in your official University email account. For most students that is Google Apps for Education (http://www.stonybrook.edu/mycloud), but you may verify your official Electronic Post Office (EPO) address at http://it.stonybrook.edu/help/kb/checking-or-changing-your-mail-forwarding-address-in-the-epo.

If you choose to forward your official University email to another off-campus account, faculty are not responsible for any undeliverable messages to your alternative personal accounts. You can set up Google Mail forwarding using these DoIT-provided instructions found at http://it.stonybrook.edu/help/kb/setting-up-mail-forwarding-in-google-mail.

If you need technical assistance, please contact Client Support at (631) 632-9800 or supportteam@stonybrook.edu.

9. Student Accessibility Support Statement

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, 128 ECC Building, (631) 632-6748, or at sasc@Stonybrook.edu. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

10. Academic Integrity Statement

Each student must pursue their academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html

11. Critical Incident Management Statement

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.