ECE 6601 Syllabus

Random Processes, ECE 6601 Section A, 3 Credits

Fall 2026

Instructor Information

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General Course Information

Description

Random variables and vectors. Joint and marginal distributions. Independence and correlation. Jointly Gaussian random vectors. Limit theorems. Markov chains, Markov chain convergence theorem. Stationarity and Ergodicity. Autocorrelation function and power spectral density. MMSE prediction and estimation. Spectral factorization. Wiener filter. Poisson process. Shot noise, Wiener process.

Course Learning Outcomes

- Understand how to predict one random variable based on observations of others
- Understand how to quantify temporal correlation of a random signal and relate it to its power spectral density
- Recognize Markov chains and understand how to analyze both transient behavior and long-term steady-state behavior
- Understand Wiener filters and related strategies for predicting or estimating one random sequence by filtering another

Required Course Materials

Probability, Random Variables and Stochastic Processes, 4th ed., Papoulis and Pillai, 0071226613.

Grading Policy

Grades are assigned according to the standard scale (A>90; B>80; C>70; D>60) before any curve, based on a total score with the following weights:

Homework	15%
Quiz 1	25%
Quiz 2	25%
Final Exam	35%

A curve is often implemented by lowering grade boundaries (raising student grades) so that the overall class GPA is consistent with historical averages (typically 3.5 or higher).

Description of Graded Components

Students will scan each homework and upload a PDF to canvas before each homework deadline. The quizzes and final exam are in class, closed book and notes except for handwritten equation sheets.

Course Policies

Attendance and/or Participation

To maximize learning, regular attendance and participation is strongly encouraged.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Core IMPACTS

Core IMPACTS is the University System of Georgia's General Education curriculum. If you are teaching a course that counts towards Core IMPACTS, you should include a syllabus statement about the Core area and associated career competencies. This resource developed by the Center for Excellence in Teaching and Learning and Online Education at Georgia State University includes template syllabus statements for each of the Core IMPACTS areas that you may adapt for your course.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Pre- &/or Co-Requisites

Graduate standing. An undergraduate-level understanding of probability and random variables is helpful.

Collaboration, Group Work, and Use of Generative AI

Collaboration is highly encouraged for homeworks, and AI can be helpful, but any work you turn in must be written in your own hand. Do not use AI to do your homework for you. Quizzes and exams must be your own work. All in-class quizzes and exams will be closed-book and closed-notes except for handwritten equation sheets.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

No late assignments accepted because solutions will be posted immediately after the deadline passes. The lowest homework score will be dropped. Make-up exams or other accommodations are given for illness, approved Institute activities or religious observances.