

Syllabus for ECE 541 Stochastic Signals & Systems (Fall 2023)

Lectures: Tuesday & Thursday 3:50 PM - 5:10 PM, Science & Engineering Resource Center Room 212 (SEC-212), Busch Campus

Instructor: [Guosong Yang \(guosong.yang@rutgers.edu\)](mailto:guosong.yang@rutgers.edu)

Office hours: Thursday 2:30 PM - 3:30 PM, EE-213

Prerequisites:

- Undergraduate courses in probability theory and linear systems
- Basic knowledge of calculus and linear algebra
- Ability to use a numerical programming language such as MATLAB or Python for assignments/projects

Grading: Homework assignments (30%), Quizzes (40%), Projects (30%)

Course materials: The primary course materials are lecture slides that will be posted on Canvas.

Recommended textbooks:

- [YG14] R. D. Yates and D. J. Goodman, *Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer Engineers*, 3rd edition, John Wiley and Sons, 2014 ([companion site available](#))
- [Haj15] B. Hajek, *Random Processes for Engineers*, Cambridge University Press, 2015 ([preprint available](#))
- [Gub06] J. A. Gubner, *Probability and Random Processes for Electrical and Computer Engineers*, Cambridge University Press, 2006 ([full text available](#))

Course outline:

- Weeks 1–4: Review of basic probability [YG14, Ch. 1–7/Gub06, Ch. 1–5]
- Weeks 5–6: Random vectors and Gaussian random vectors [YG14, Ch. 8/Gub06, Ch. 7–9]
- Weeks 7–8: Random processes [YG14, Ch. 13/Gub06, Ch. 10–11]
- Weeks 9–10: Markov chains [YG14, Markov Chains Supplement/Gub06, Ch. 12]
- Weeks 11–12: Convergence for random variables [Haj15, Ch. 2]
- Weeks 13–14: Estimation of random vectors [Haj15, Ch. 3]

Helpful resources:

- [On inclusiveness](#)
- [Information on academic integrity, learning support, student wellness, and more](#)
- [Canvas help](#)

On inclusiveness

We must treat every individual with respect. We are diverse in many ways, and this diversity is fundamental to building and maintaining an equitable and inclusive campus community. Diversity can refer to multiple ways that we identify ourselves, including but not limited to race, color, national origin, language, sex, disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status, or genetic information. Each of these diverse identities, along with many others not mentioned here, shape the perspectives our students, faculty, and staff bring to our campus.

In engineering, accounting for and incorporating these diverse perspectives fuels excellence and innovation. In turn, our goal is to develop the tools to let us build technologies to support and sustain a more just and equitable future for all.

(Adapted from [Carnegie Mellon University](#))

Information on academic integrity, learning support, student wellness, and more

Information on all of the following resources, and many more, can be found at <https://success.rutgers.edu/>

Academic Integrity

115 College Avenue, New Brunswick | (848) 932-9414 | academicintegrity.rutgers.edu

Academic integrity is essential to the success of the University's educational and research missions, and violations of academic integrity constitute serious offenses against the entire academic community. Every member of the University community bears a responsibility for ensuring that the highest standards of academic integrity are upheld.

Websites are available with resources for faculty and students on maintaining academic integrity. The websites provide advice on how to avoid cheating and foster a culture of accountability as well as information on the University Academic Integrity Policy and Procedures.

- Resources for Faculty: rutgers.edu/academic-integrity
 - Resources for Students: rutgers.edu/academic-integrity-students
-

Tutoring, Academic Coaching, Learning Support

Rutgers Learning Centers | (848) 445-0986 | rlc.rutgers.edu & success.rutgers.edu

Academic coaching is a comprehensive service for students who want to improve their academic and self-management skills, such as time management, organization, and study skills. The Rutgers Learning Centers offer this support, along with tutoring and study groups to help students achieve their academic goals along with self-advocacy and independent, life-long learning. They also have information on how to be a successful learner in an online environment.

Advising

SoE Office of Academic Services

Engineering B100, Busch Campus | (848) 445-2212 | soe.rutgers.edu/oas/advising

Undergraduate advisors and deans at the School of Engineering are available to assist students with inquiries related to course planning, academic policies, professional development, scholastic standing, degree progress, withdrawal options, and more.

Advising will be offered in person and online. Students can visit soe.rutgers.edu/oas/advising for appointments or drop-in meetings with an advisor. Drop-in advising will only be online.

Student Wellness

Counseling, ADAP & Psychiatric Services (CAPS)

17 Senior Street, New Brunswick | (848) 932-7884 | health.rutgers.edu/medical-counseling-services/counseling

CAPS is a university mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professionals within Rutgers Health Services to

support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners. They continue to be available online.

Violence Prevention & Victim Assistance (VPVA)

3 Bartlett Street, New Brunswick | (848) 932-1181 | vpva.rutgers.edu

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To speak with someone immediately, call 848-932-1181.

Office of Disability Services

Lucy Stone Hall, Suite A145, Livingston Campus | (848) 445-6800 | ods.rutgers.edu

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the Office of Disability Services, participate in an intake interview, and provide documentation. If the documentation supports a student's request for reasonable accommodations, the Office of Disability Services will provide you with a Letter of Accommodations. Students then share this letter with their instructors and discuss the accommodations with them as early in the courses as possible.

Course or Semester Withdrawal

Online or Visit Engineering B100 | soe.rutgers.edu/academic-advising-and-policies/registration-and-scheduling

- 09/14/23: Last day to drop classes without a "W", and last day to add a class.
- 10/30/23: Last day to drop classes via WebReg.
- 11/13/23: Extension last day to drop an SoE class (14:###:###). Must email or meet with an academic advisor or dean.
- 12/13/23: Last Day of Classes
- 12/15/23: Last day to withdraw from school (all classes with "W" grades, no refund, must submit a semester withdrawal form)