

# **EE 605 PROBABILITY AND STOCHASTIC PROCESSES I**

*Stevens Institute of Technology*

Fall 2021

Instructor: Goran Djuknic, PhD

Course Schedule: Sunday-Saturday

Contact Info: [gdjuknic@hotmail.com](mailto:gdjuknic@hotmail.com)

Virtual Office Hours: Thursday 8-10 pm EST

## **COURSE DESCRIPTION**

Topics covered:

Combinatorial Analysis  
Axioms of Probability  
Conditional Probability and Independence  
Random Variables  
Continuous Random Variables  
Jointly Distributed Random Variables  
Properties of Expectation  
Limit Theorems  
Introduction to Stochastic Processes

## **STUDENT LEARNING OUTCOMES**

After successful completion of this course, students will be able to...

- ... evaluate probabilities in compound situations involving a sequence of operations using the axioms of probability, independence arguments, the law of total probability and Bayes's Theorem.
- ... evaluate probabilities in situations consisting of a finite number of equally likely outcomes, using combinatorial methods.
- ... model and evaluate in a probabilistic manner systems and situations involving continuous random variables. (e.g., uniform, exponential, normal, etc).

- ... model and evaluate in a probabilistic manner systems and situations involving discrete random variables (e.g., Bernoulli, binomial, geometric, hyper-geometric, negative binomial, Poisson, etc).

## COURSE FORMAT AND STRUCTURE

This course is fully online. To access the course, please visit [stevens.edu/canvas](https://stevens.edu/canvas) (Links to an external site.) . For more information about course access or support, contact the Technology Resource and Assistance Center (TRAC) by calling 201-216-5500.

### Course Logistics

- Instructional materials and reading assignments for the week will be posted every Sunday.

### Instructor's Online Hours & Virtual Office Hours

Thursdays 8-10 pm EST

Instructor is also available via email [gduknic@hotmail.com](mailto:gduknic@hotmail.com) .

## TENTATIVE COURSE SCHEDULE

Week Starting	Topic	Required	Assignment
		Reading	
Aug 29	Introduction	Textbook Ch. 2	No assignment
Sep 5	Axioms of Probability	Textbook Ch. 2	Homework 1
Sep 12	Combinatorial Analysis	Textbook Ch. 1	Homework 2
Sep 19	Conditional Probability & Independence	Textbook Ch. 3	Homework 3
Sep 26	Discrete Random Variables	Textbook Ch. 4	Homework 4

Oct 3	Continuous Random Variables (Part I)	Textbook Ch. 5	Homework 5
Oct 10	Continuous Random Variables (Part II)	Textbook Ch. 5	Homework 6
<b>Fri Oct 22</b>			
Oct 17	No new material covered	<b>7-9 pm EST</b>	No assignment
<b>Midterm Exam</b>			
Oct 24	Jointly Distributed Random Variables (Part I)	Textbook Ch. 6	Homework 7
Oct 31	Jointly Distributed Random Variables (Part II)	Textbook Ch. 6	Homework 8
Nov 7	Properties of Expectation	Textbook Ch.7	Homework 9
Nov 14	Limit Theorems	Textbook Ch. 8	Homework 10
Nov 21	Thanksgiving Holiday	No new material covered	No assignment
Nov 28	Poisson process	Textbook Ch. 9.1	Homework 11
Dec 5	Entropy	Textbook Ch. 9.3-4	Homework 12
<b>Fri Dec 10</b>			
<b>7-9 pm EST</b>			
<b>Final Exam</b>			

## COURSE MATERIALS

Textbook: Sheldon Ross, *A First Course in Probability*, Tenth edition, Prentice Hall.

ISBN 13: 978-0-13-475311-9

ISBN 10: 0-13-475311-9

Other Readings & Materials: Will be posted as needed.

## COURSE REQUIREMENTS

- Homework assignments will be posted on Sundays, and students will have to upload their work by Saturday midnight. Time and completeness of submissions will be recorded, but the work will not be graded. Solutions to homework problems will be provided.
- There will be a Midterm Exam and a Final exam.

## **TECHNOLOGY REQUIREMENTS**

Baseline technical skills necessary for online courses

- Basic computer and web-browsing skills
- Navigating Canvas

Required Equipment

- Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection

Required Software

- Microsoft Word
- Microsoft PowerPoint

## **GRADING PROCEDURES**

Grades will be based on:

Homework	20%
Midterm Exam	40%
Final Exam	40%

Late Policy:

- Late homework will get 50% of the points. Points for incomplete homework will be prorated accordingly.

Academic Integrity

**Graduate Student Code of Academic Integrity**

All Stevens graduate students promise to be fully truthful and avoid dishonesty, fraud, misrepresentation, and deceit of any type in relation to their academic work. A student's submission of work for academic credit indicates that the work is the student's own. All outside assistance must be acknowledged. Any student who violates this code or who knowingly assists another student in violating this code shall be subject to discipline.

All graduate students are bound to the Graduate Student Code of Academic Integrity by enrollment in graduate coursework at Stevens. It is the responsibility of each graduate student to understand and adhere to the Graduate Student Code of Academic Integrity. More information including types of violations, the process for handling perceived violations, and types of sanctions can be found at [www.stevens.edu/provost/graduate-academics](http://www.stevens.edu/provost/graduate-academics) (Links to an external site.).

## **EXAM CONDITIONS**

The following procedures apply to exams for this course. As the instructor, I reserve the right to modify any conditions set forth below by printing revised Exam Conditions.

Exams will be done online, with instructor posting the exam at the beginning of the exam time, and students posting their solutions by the end of the exam time.

Students may use the following materials during exams. Any materials that are not mentioned in the list below are not permitted.

<b>Material</b>	<b>Permitted?</b>	
	Yes	No
Handwritten Notes	x	
Typed Notes	x	
Textbooks	x	
Readings	x	

Students are not allowed to work with other students during exams, seek help from third parties, or search the Internet for solutions.

## **LEARNING ACCOMMODATIONS**

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. The Office of Disability Services (ODS) works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, psychiatric disorders, and other such disabilities in order to help students achieve their academic and personal potential. They facilitate equal access to the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage independence and self-advocacy with support from the ODS staff. The ODS staff will facilitate the provision of accommodations on a case-by-case basis.

For more information about Disability Services and the process to receive accommodations, visit <https://www.stevens.edu/office-disability-services> (Links to an external site.). If you have any questions please contact: Phillip Gehman, the Director of Disability Services Coordinator at Stevens Institute of Technology at [pgehman@stevens.edu](mailto:pgehman@stevens.edu) or by phone 201-216-3748.

### **Disability Services Confidentiality Policy**

Student Disability Files are kept separate from academic files and are stored in a secure location within the Office of Disability Services. The Family Educational Rights Privacy Act (FERPA, 20 U.S.C. 1232g; 34CFR, Part 99) regulates disclosure of disability documentation and records maintained by Stevens Disability Services. According to this act, prior written consent by the student is required before our Disability Services office may release disability documentation or records to anyone. An exception is made in unusual circumstances, such as the case of health and safety emergencies.

## **INCLUSIVITY**

### **Name and Pronoun Usage**

As this course includes group work and class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect. This includes the ability for all students to have their chosen gender pronoun(s) and chosen name affirmed. If the class roster does not align with your name and/or pronouns, please inform the instructor of the necessary changes.

### **Inclusion Statement**

Stevens Institute of Technology believes that diversity and inclusiveness are essential to excellence in academic discourse and innovation. In this class, the perspective of people of all races, ethnicities, gender expressions and gender identities, religions, sexual orientations,

disabilities, socioeconomic backgrounds, and nationalities will be respected and viewed as a resource and benefit throughout the semester. Suggestions to further diversify class materials and assignments are encouraged. If any course meetings conflict with your religious events, please do not hesitate to reach out to your instructor to make alternative arrangements.

You are expected to treat your instructor and all other participants in the course with courtesy and respect. Disrespectful conduct and harassing statements will not be tolerated and may result in disciplinary actions.

## **MENTAL HEALTH RESOURCES**

Part of being successful in the classroom involves a focus on your whole self, including your mental health. While you are at Stevens, there are many resources to promote and support mental health. The Office of Counseling and Psychological Services (CAPS) offers free and confidential services to all enrolled students who are struggling to cope with personal issues (e.g., difficulty adjusting to college or trouble managing stress) or psychological difficulties (e.g., anxiety and depression) and who can visit the office in person. CAPS is open from 9:00 am – 5:00 pm Mondays, Wednesdays, Thursdays and Fridays and from 9:00 am – 7:00 pm on Tuesdays during the Fall and Spring semesters; appointments are highly encouraged. For those students who cannot visit the Stevens campus for an in-person appointment, you can contact a local mental health care provider for an in-person appointment, or if you are enrolled in the Stevens Student Health Insurance, you may call Care Connect for 24/7 mental health support at 1-888-857-5462.

## **EMERGENCY INFORMATION**

In the event of an urgent or emergent concern about the safety of yourself or someone else in the Stevens community, please immediately call the Stevens Campus Police at 201-216-5105 or on their emergency line at 201-216-3911. These phone lines are staffed 24/7, year round. For students who do not reside near the campus and require emergency support, please contact your local emergency response providers at 911 or via your local police precinct. Other 24/7 national resources for students dealing with mental health crises include the National Suicide Prevention Lifeline (1-800-273-8255) and the Crisis Text Line (text “Home” to 741-741). If you are concerned about the wellbeing of another Stevens student, and the matter is *not* urgent or time sensitive, please email the CARE Team at [care@stevens.edu](mailto:care@stevens.edu). A member of the CARE Team will respond to your concern as soon as possible.