



**Course title and number** ECEN 303, Section 502: Random Signals and Systems  
**Term** Fall 2019  
**Meeting times & location** Lectures: MWF 12:40pm – 1:30pm, ZACH 241

- ✓ **Peer teacher-led weekly workshops:** Sep. 17 (T) 6-7pm, Wisenbaker 236C  
From Sep. 24, T 5:30-6:30pm, Wisenbaker 049
- ✓ Please check eCampus and emails frequently for notices and materials if not given in class.

### Course Description and Prerequisites

Basic concepts of probability and its applications to engineering problems will be introduced in this course. The proposed treatment of subject includes set operations, probabilistic models, conditional probability and independence, total probability theorem and Bayes' rule, and notions of combinatorics. An important part of this course includes discussion of discrete and continuous random variables, common distributions, functions, and expectations. Many examples will be covered from science, engineering, and daily life. A tentative lecture-to-lecture outline is provided in Course Topics.

### Learning Objectives

It is not the ultimate objective of this course to have students memorize formulas and use them rigidly. Rather, we aim at having students

- “develop the ability to construct and analyze probabilistic models in a manner that combines intuitive understanding and mathematical precision” (See Preface of our textbook); and
- master the skills to address uncertainty and solve real-world problems in engineering and beyond.

### Instructor Information

Name	Yang Shen
Telephone number	979-862-1694
Email address	yshen@tamu.edu
Office hours	M 10-11am and T 4:30-5:30pm (except Sep. 17: 5-6pm)
Office location	Wisenbaker Engineering Building 215I
Peer Teacher	Jacob
Office hours	MF 11:30am-12:30pm
Office location	Wisenbaker 049

### Textbook and Resource Material

Recommended Textbooks:

- **[BT]** Dimitri Bertsekas and John Tsitsiklis. *Introduction to Probability* (2<sup>nd</sup> Edition). Athena Scientific, 2008.
- **[CP]** Jean-Francois Chamberland-Tremblay and Henry Pfister. *Undergraduate Probability I*. 2014. (Access to an electronic copy will be shared on eCampus.)

Other Recommendations:

- Sheldon Ross. *A First Course in Probability* (9<sup>th</sup> Edition). Pearson, 2013.

## Grading Policies

Weights towards final grades:

- 15% Homework (About one assignment per two weeks.)
  - 10% Projects (Computer programming can be involved. No restriction on specific language.)
  - 25% Midterm Exam 1
  - 25% Midterm Exam 2
  - 25% Final Exam
- ✓ Each homework or project is expected to be submitted before the lecture on the due date. Late submission would incur a penalty of 10% each calendar day after the due time, up to a maximum of 7 calendar days. For instance, submissions on the due date but after the due time receive 90% of their scores, those on the next day receive 80%, and those late for > 7 days are not accepted.
- ✓ Exams are closed-book and closed-notes.

Final grades will be determined numerically based solely on individual standing to reflect how well students do in quizzes and exams. This approach is adopted to ensure at least a fair mechanism to assess how well students learn course materials and accomplish course goals. Therefore, grades are very unlikely to change unless a mistake was made in grading or adding numbers.

Grading Scale:

A	[90%, 100%]
B	[80%, 90%)
C	[70%, 80%)
D	[60%, 70%)
F	[ 0%, 60%)

## Suggestions on Study Habits

As the instructor I will do my best to help you understand course materials and accomplish course goals. To this end, we will design lectures and recitations to lead you through step by step and give homework assignments, projects, and exams to provide feedbacks on your progress. We will also use regular office hours to understand and address your study needs better.

Our support is in no place replacing your own efforts. Better study habits following our lead will help you accomplish your goals more effectively. And here is a list of suggestions that you might find beneficial:

- ✓ **Read course materials prior to lectures** to at least have a sense about what will be covered next.
- ✓ **Attend lectures (and peer teacher-led recitations, if applicable) regularly and avoid absence.** (See more in Attendance and Make-up Policies). Missing a lecture would inevitably disrupt your step-by-step study plan that is carefully designed. In case of having to miss a lecture or recitation, please watch recorded lectures, ask the instructor and fellow students for related course materials, study them by yourself as soon as possible, and ask questions during office hours.
- ✓ **Do your homework and do it by yourself.** Work on your homework and make your best efforts before the due date. Each homework problem is a chance to apply new knowledge and hone new skills, not to mention that it is a chance to prepare for the exams and improve your scores. You are allowed to discuss about homework problems with other students when conceptualizing solutions. But you are expected to generate the written solutions, in scrap or final form, by yourself. ***The use of existing solutions from any source (other students, the internet, etc.) is a violation of the Aggie Honor Code and is subject to the honor code penalties.***
- ✓ Over the weekend, **review materials and readings** covered in the preceding week and work on additional exercises on your own as needed (we are more than happy to provide resources!).
- ✓ Use assignments and exams to **assess and adjust your study habits.**

With diligence, patience, and good habits, you will not only succeed in the course but also master the skills of thinking under and dealing with uncertainty in signals, systems, and beyond! We will be here to

provide all guidance and support that you need.

### Attendance and Make-up Policies

Regular and punctual attendance to the lectures and recitations facilitates the effective implementation of a systematic study plan. Please consult student rule 7 for additional information: <http://student-rules.tamu.edu/rule07>.

- ✓ Late homework submissions or makeup quizzes / exams are allowed under an approved university excused absence (see a list in student rule 7). Please contact the instructor with a written request *prior to* the due date or the quiz / exam affected.

### Course Topics, Calendar of Activities, Major Assignment Dates

Here is the tentative course outline with approximately assigned lecture time:

Lecture	Topic	Related Reading
1-3	Introduction and Mathematical Review	BT1.1 / CP1
4-5	Basic Concepts about Probability	BT1.2 / CP3
6-8	Equiprobable Outcomes and Counting	BT1.6 / CP2
9-10	Conditional Probability	BT1.3 / CP4.1
11-13	Total Probability Theorem and Bayes' Rule	BT1.4 / CP4.2
14-15	Independence	BT1.5 / CP4.3
16	Summary I	BT1.7 and Lectures 1-15
17-20	Discrete Random Variables	BT2.1-2.4 / CP5-6
21-24	Discrete Random Vectors	BT2.5-2.8 / CP7
25-29	Continuous Random Variables	BT3.1-3.3 / CP8
30-33	Jointly Distributed Random Variables	BT3.4-3.6, (4.1, 4.4) / CP9-11
34	Summary II	BT3.7 and Lectures 16-33
35-37	Limit Theorems	BT5 / CP12
38-39	More Real-World Applications	

Important Dates (*subject to change*)

- Midterm Exam 1: **Oct. 11, 2019 (F)**
- Midterm Exam 2: **Nov. 8, 2019 (F)**
- Final Exam: **Dec. 9, 2019 (M), 10:30am – 12:30pm** (University Schedule)

### Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit <http://disability.tamu.edu>.

### Academic Integrity

For additional information please visit: <http://aggiehonor.tamu.edu>

*"An Aggie does not lie, cheat, or steal, or tolerate those who do.*