

## Course Information

Course Number:	606
Course Title:	Theory of Probability I
Section:	600
Time:	TR 9:30 am - 11 am
Location:	zoom (and BLOC 128)
Credit Hours:	3

## Instructor Details

Instructor:	Patricia Alonso Ruiz
Office:	zoom
Phone:	
E-Mail:	paruiz@tamu.edu
Office Hours:	TR noon - 1:00 pm

## Course Description

*The course is a mathematically rigorous introduction to Probability theory. Among others we discuss concepts from measure and integration theory, convergence of random variables, independence, laws of large numbers, characteristic functions, the central limit theorem, conditional expectation and martingales.*

## Course Prerequisites

*MATH 607 (Real variables I); MATH 447 (Principles of Analysis II) or equivalent; MATH 411 (Mathematical Probability) or equivalent.*

## Course Learning Outcomes

*As a student in this course you will:*

- ★ *Identify and reproduce the theoretical framework underlying a probability space.*
- ★ *Recognize and apply basic tools of measure theory in probability.*
- ★ *Understand different types of convergence of sequences of random variables and limit theorems.*
- ★ *Be able to determine martingales and stopping times.*
- ★ *Be expected to understand definitions and theoretic statements as well as the proofs of crucial theorems.*
- ★ *Experience scientific writing with LaTeX.*
- ★ *Increase your oral presentation skills.*

## Textbook and/or Resource Materials

The course will be partially based on “Probability: theory and examples” by Richard Durrett, Duxbury Press, 4th edition, 2010. An updated version of this book is available online on [his website](#). Lecture notes will become available in the Canvas course website as the course moves on (more details below). Other helpful but not required resources:

- ★ *Probability with martingales*, by D. Williams, Cambridge University Press, Cambridge, 1991.
- ★ *Probability theory*, by R.S. Varadhan, American Mathematical Society, 2001.

Please note that the lectures will NOT follow any text verbatim.

## Grading Policy

The final grade will be based on the results of individual and group assignments, written work and a final presentation. Precise details will be provided at the beginning of the course, the following are guidelines.

- Grading scale: A: 100-90, B:90-80, C:80-70, D:70-60, F:60-0.
- Written work (25%): Each week a student will be responsible for typing the corresponding lecture notes in LaTeX. This may include completing proofs and/or short exercises.
- Homework (50%): A set of problems will appear at the end of each chapter to be worked out collaboratively.
- Presentation (25%): At the end of the semester, each student is expected to give a short presentation about a result of their own choice.

**Graded Attendance** – Attendance is expected and may affect the final grade. Excuses for absences must be substantiated by appropriate documentation. As far as possible, you should inform me and provide the pertinent documentation before a class period is missed.

**Grading Policy Changes** – The course grading policy may be subject to changes only until the second class session. (See Student Rule 10.)

## Late Work Policy

- Late work (i.e. submitted after the established deadline) may only be accepted under documented justification.

## Course Schedule

Tentative approximate schedule:

Measure theory and integration (2 weeks); random variables (1 week); laws of large numbers (1week); (2 weeks); weak convergence and the central limit theorem (2 weeks); conditional expectation (2 weeks); Martingales (2 weeks).

*Traditionally Delivered Course – 15 weeks.*

*Technology Support – If you have any questions or need assistance with Canvas, please contact [Help Desk Central](#). 24 hours a day, 7 days a week. **Email:** [helpdesk@tamu.edu](mailto:helpdesk@tamu.edu), **phone:** (979) 845 – 8300.*

*Learning Resources – Information about how to use LaTeX and/or Overleaf is available at: [https://www.overleaf.com/learn/latex/Creating\\_a\\_document\\_in\\_LaTeX](https://www.overleaf.com/learn/latex/Creating_a_document_in_LaTeX).*

## University Policies

### Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

Please refer to [Student Rule 7](#) in its entirety for information about excused absences, including definitions, and related documentation and timelines.

### Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student’s grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to [Student Rule 7](#) in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor” ([Student Rule 7, Section 7.4.1](#)).

“The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence” ([Student Rule 7, Section 7.4.2](#)).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See [Student Rule 24](#).)

### Academic Integrity Statement and Policy

“An Aggie does not lie, cheat or steal, or tolerate those who do.”

“Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one’s work,

should the instructor request it, may be sufficient grounds to initiate an academic misconduct case” ([Section 20.1.2.3, Student Rule 20](#)).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at [aggiehonor.tamu.edu](http://aggiehonor.tamu.edu).

**NOTE:** Faculty associated with the main campus in College Station should use this Academic Integrity Statement and Policy. Faculty not on the main campus should use the appropriate language and location at their site.

### Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Resources in the Student Services Building or at (979) 845-1637 or visit [disability.tamu.edu](http://disability.tamu.edu). Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

**NOTE:** Faculty associated with the main campus in College Station should use this Americans with Disabilities Act Policy statement. Faculty not on the main campus should use the appropriate language and location at their site.

### Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see [University Rule 08.01.01.M1](#)):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, a person who is subjected to the alleged conduct will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University’s goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with [Counseling and Psychological Services](#) (CAPS).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's [Title IX webpage](#).

**NOTE:** Faculty associated with the main campus in College Station should use this Title IX and Statement on Limits of Liability. Faculty not on the main campus should use the appropriate language and location at their site.

### Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in healthy self-care by utilizing the resources and services available from Counseling & Psychological Services (CAPS). Students who need someone to talk to can call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at [suicidepreventionlifeline.org](https://suicidepreventionlifeline.org).

### College and Department Policies

College and departmental units may establish their own policies and minimum syllabus requirements. As long as these policies and requirements do not contradict the university level requirements, colleges and departments can add them in this section.