

# STAT 6201

## Mathematical Statistics I

### Syllabus

---

Fall 2021

Instructor: Hua Liang

Email: [hliang@gwu.edu](mailto:hliang@gwu.edu)

Virtual Office Hours: Email for an appointment

*Note: This syllabus is subject to change based on the needs of the class.*

#### Instructor Response Time

---

Emails will receive responses within 24 hours. Assignments will be returned within one week.

#### Course Description

---

The goal of the course is to help students develop an appropriate level of mathematical and statistical literacy and competency. Sections from Chapters 1 - 5/6 of the textbook will be covered. Topics will include basics of probability theory, random variables and transformations of random variables, expectation and variance, moment generating functions, joint distributions, covariance and correlation, order statistics, convergence concepts. Some examples with detailed analyses in R may be provided.

#### Course Objectives

---

By the end of this course, you should be able to:

1. Apply probability theory to various scenario;
2. Demonstrate properties of commonly used distributions;
3. Derive distributions of multiple random variables;
4. Calculate expectation and variance and derive moments;
5. Identify the appropriate sample for a given scenario;
6. Synthesize and present knowledge gained through course projects.

## Prerequisites

---

### Academic

An introductory course in Statistics and/or probability can be helpful, but is not required. Students are assumed to be familiar with integral and differential calculus, basic algebra for instance extraction of roots of equations of the second and third degree, and accurate manipulation of algebraic expressions.

### Technological

As a learner in an online course you need to ensure you have the required technology and skills to fully participate. Please consult the [GW Online website](#) for further information.

You should be able to:

- Use a personal computer and its peripherals.
- Download and install any software needed for the course.
- Use email and other communication tools with attachments.
- Access your GW email for university-related communications (see [Office of the Registrar website](#)).
- Use word processing and other productivity software to submit assignments.
- Use web conferencing tools to collaborate with other course participants.
- Use your computer to upload documents, recordings, and images.
- Seek technology help by contacting [GW Information Technology](#) (202-994-4948) or [ithelp@gwu.edu](mailto:ithelp@gwu.edu).

If you have any problems with the software in this course, please reference the **Technology Help** link in the left navigation menu in our course on Blackboard.

## Textbooks & Materials

---

### Textbook

***Statistical Inference (Second Edition)* by George Casella and Roger L. Berger.**

The textbook can be obtained through online retailers or the GW Bookstore.

Other materials are provided in the Blackboard course.

## Credit Hour Policy

---

Over the next 15 weeks, you will spend 2 hours per week engaged in recorded video lectures and 1 hour per week in participating in the weekly discussion exercises (37.5 STAT 6201: Mathematical Statistics I

hours for the semester). Homework and other independent work (e.g. readings, homework assignments, exams, projects, etc.) is estimated at around 5 hours per week (75 hours for the semester) and includes a 2-hour final exam or project/paper for which approximately 10 hours of review is assumed.

## Methods of Instruction and Assessment

---

This course uses the following methods of instruction and assessment. Their overarching purpose is to provide opportunities for active learning and skills development, which will support you in achieving course objectives.

### Methods of Instruction

- **Lectures:** Each module will include at least one lecture designed to introduce key ideas, themes, and concerns. You are encouraged to take notes while listening to lectures and to review these lectures more than once. Viewing and understanding lectures helps you participate more fully in discussion boards and submit meaningful assignments.
- **Readings:** Each week you will be responsible for various reading assignments. The readings work in tandem with course lectures to help you understand course concepts, be able to participate in discussions with peers, and also complete assignments.

### Methods of Assessment

The following assessments are indicators of your progress in the course and are intended to help you achieve course objectives.

- **Homework:** You will complete homework assignments on a bi-weekly basis. These homeworks are formative assessments based on readings and lectures.
- **Exams:** You will demonstrate continued proficiency with course content through completion of two exams. Keeping up with readings and lectures and reaching out to the TA and instructor for assistance can help you prepare for the exams.

## Academic Integrity

---

This course will comply with [the University's Code of Student Conduct](#). The Code of Academic Integrity defines academic dishonesty as "cheating of any kind, including misrepresenting one's work, taking credit for work of others without crediting them and without appropriate authorization, and the fabrication of information." Common examples of academic dishonesty include cheating, fabrication, plagiarism, falsification, forgery of University academic documents, and facilitating academic dishonesty by others.

Consult GW's [Academic Dishonesty Prevention resource](#) for further information and support.

## Grading

---

This course uses the following grading schema.

Assignment Type	Point Value Per Assignment	Number of Assignments	Total Percent of Final Grade
Homework	100	6	30%
Exam 1	100	1	30%
Exam 2	100	1	40%
			100%

The grading scale below determines your final letter grade.

- 90 - 100 = A
- 80 - 89 = B
- 70 - 79 = C
- 55 - 69 = D
- 0 - 54 = F

## Late Work

---

It is your responsibility to ensure that all work for the course is properly completed and submitted by the posted deadlines. Late work will not be accepted.

## Incomplete Grades

---

### Graduate students

Incomplete grades may be given to undergraduate students only if for reasons beyond the student's control (such as medical or family emergency) s/he is unable to complete the final work of the course. Faculty should not assign an incomplete grade if not asked by the student.

Please consult with your advisor and complete a [CCAS graduate student incomplete grade form](#).

## Netiquette

---

Please observe the following rules of netiquette for communicating online:

- Remain professional, respectful, and courteous at all times.
- Remember that a real human being wrote each post and will read what you write in response. It is easy to misinterpret discussion posts. Let's give the benefit of the doubt.
- If you have a strong opinion on a topic, it is acceptable to express it as long as it is not phrased as an attack. Please be gracious with differing opinions.
- When upset, wait a day or two prior to posting. Messages posted (or emailed) in anger are often regretted later.
- Proofread and use the spell check tool when you type a post. It makes the post easier to read and helps your readers understand what you are saying.

I reserve the right to delete any post that is deemed inappropriate for the discussion forum, blog, or wiki without prior notification to the student. This includes any post containing language that is offensive, rude, profane, racist, or hateful. Posts that are seriously off-topic or serve no purpose other than to vent frustration will also be removed.

## Policies

---

The following are university- and course-related policies that all course participants should read and understand. Please contact me if you have any questions.

---

### Differences in Time Zone

All the times in this Blackboard course correspond to U.S. Eastern Time zone (e.g., Washington, DC). It is your responsibility to convert these times to the time zone of your location so you can meet this course's deadlines.

### Inclement Weather

Please note that online courses at the George Washington University will continue to be held even when the University is closed for inclement weather.

### Disability Support Services and Accessibility

Any student who may need an accommodation based on the impact of a disability should contact the [Office of Disability Support Services](#) (DSS) to inquire about the documentation necessary to establish eligibility, and to coordinate a plan of reasonable and appropriate accommodations. DSS is located in Rome Hall, Suite 102. For

additional information, please call DSS at 202-994-8250, or consult <https://disabilitysupport.gwu.edu>.

For information about how the course technology is accessible to all learners, see the following resources:

- [Blackboard accessibility policy](#)
- [Kaltura \(video platform\) accessibility policy](#)
- [Microsoft Office accessibility policy](#)
- [Adobe accessibility policy](#)
- [R accessibility information](#)

## Religious Observances

In accordance with University policy, students should notify faculty during the first week of the semester of their intention to be absent from class on the day(s) of religious observance. Please consult [the university policy on religious holiday observance](#) for further information.

## Acceptable Use Policy for Computing Systems and Services

All members of the George Washington University must read and comply with the [Acceptable Use Policy](#) when accessing and using computing systems and services, including email and Blackboard. Please read the [Acceptable Use Policy](#) to familiarize yourself with how GW systems are to be used ethically.

## Sharing of Course Content

Unauthorized downloading, distributing, or sharing of any part of a recorded lecture or course materials, as well as using provided information for purposes other than the student's own learning may be deemed a violation of GW's Student Conduct Code.

## Use of Student Work (FERPA)

The professor will use academic work that you complete during this semester for educational purposes in this course during this semester. Your registration and continued enrollment constitute your consent.

## Copyright Policy Statement

Copyright Restriction: Materials used in connection with this course may be subject to copyright protection under Title 17 of the United States Code. Under certain Fair Use circumstances specified by law, copies may be made for private study, scholarship, or research. Electronic copies should not be shared with unauthorized users. If a user fails

to comply with Fair Use restrictions, he/she may be liable for copyright infringement. For more information, see the [GW Copyright Policy](#) and [Fair Use guidelines](#).

## Emergency Preparedness and Response

The University has asked all faculty to inform students of these procedures, prepared by the [GW Office of Public Safety and Emergency Management](#) in collaboration with the Office of the Executive Vice President for Academic Affairs.

### To Report an Emergency or Suspicious Activity

Call the University Police Department at 202-994-6111 (Foggy Bottom) or 202-242-6111 (Mount Vernon).

### Shelter in Place - General Guidance

Although it is unlikely that we will ever need to shelter in place, it is helpful to know what to do just in case. No matter where you are, the basic steps of shelter in place will generally remain the same.

- If you are inside, stay where you are unless the building you are in is affected. If it is affected, you should evacuate. If you are outdoors, proceed into the closest building or follow instructions from emergency personnel on the scene.
- Locate an interior room to shelter inside. If possible, it should be above ground level and have the fewest number of windows. If sheltering in a room with windows, move away from the windows. If there is a large group of people inside a particular building, several rooms may be necessary.
- Shut and lock all windows (for a tighter seal) and close exterior doors.
- Turn off air conditioners, heaters, and fans. Close vents to ventilation systems as you are able. (University staff will turn off ventilation systems as quickly as possible).
- Make a list of the people with you and ask someone to call the list in to UPD so they know where you are sheltering and who is with you. If only students are present, one of the students should call in the list.
- Await further instructions. If possible, visit GW Campus Advisories for incident updates or call the GW Information Line 202-994-5050.
- Make yourself comfortable and look after one other. You will get word as soon as it is safe to come out.

### Evacuation

An evacuation will be considered if the building we are in is affected or we must move to a location of greater safety. We will always evacuate if the fire alarm sounds. In the event of an evacuation, please gather your personal belongings quickly (purse, keys, GWorld card, etc.) and proceed to the nearest exit. Every classroom has a map at the door designating both the shortest egress and an alternate egress. Anyone who is

physically unable to walk down the stairs should wait in the stairwell, behind the closed doors. Firemen will check the stairwells upon entering the building.

Once you have evacuated the building, proceed to our primary rendezvous location: the courtyard area between the GW Hospital and Ross Hall. In the event that this location is unavailable, we will meet on the ground level of the Visitors Parking Garage (I Street entrance, at 22nd Street). From our rendezvous location, we will await instructions to re-enter the School.

### Alert DC

Alert DC provides free notification by e-mail or text message during an emergency. Visit [GW Campus Advisories](#) for a link and instructions on how to sign up for alerts pertaining to GW. If you receive an Alert DC notification during class, you are encouraged to share the information immediately.

### GW Alert

GW Alert provides popup notification to desktop and laptop computers during an emergency. In the event that we receive an alert to the computer in our classroom, we will follow the instructions given. You are also encouraged to download this application to your personal computer. Visit [GW Campus Advisories](#) to learn how.

### Additional Information

Additional information about emergency preparedness and response at GW or the University's operating status can be found on [GW Campus Advisories](#) or by calling the GW Information Line at 202-994-5050.