

COURSE AND CONTACT INFORMATION

- Course: STAT-4158-10 Introduction to Mathematical Statistics II
- Semester: Fall, 2023
- Time: Tuesday, 6:10PM - 8:40PM
- Location: Phillips Hall, #416

INSTRUCTOR

- Name: Yinglei Lai, Ph.D.
- Campus Address: Rome Hall (801 22nd Street) / Room 752
- Phone: 202-994-6664
- E-mail: ylai@gwu.edu (preferred)
- Office hours: Tuesday, 3:00PM – 5:00PM, or by appointment

COURSE DESCRIPTION

Inference procedures, including estimation, hypothesis testing, regression analysis, and experimental design.

COURSE PREREQUISITES

- MATH-1232 or equivalent (also STAT-4157 or equivalent preferred)

LEARNING OUTCOMES:

As a result of completing this course, you will be able to:

- Perform fundamental statistical estimation and hypothesis testing
- Perform fundamental regression analysis
- Perform fundamental experimental design

(at a fundamental level. More course work studies and/or practical experience of advanced statistical inference are needed for more sophisticated tasks.)

TEXTS

- Mathematical Statistics with Applications by D. Wackerly, W. Mendenhall III and R. Scheaffer
 - SEVENTH EDITION, 2008

Average amount of direct instruction and average minimum amount of independent (out-of-class)

learning expected per week: For each credit, students are expected to spend a minimum of 100 minutes in independent learning for every 50 minutes of direct instruction for a minimum total of 2.5 hours per week or 37.5 hours for the semester. A 3-credit course, for example, would include 2.5 hours of direct instruction and a minimum of 5 hours of independent learning per week for a combined minimum total of 7.5 hours per week or 112.5 hours per semester. See Assignment of Credit Hour Policy (<http://provost.gwu.edu/policies-procedures-and-guidelines>) for more information.

WEEK-BY-WEEK (TENTATIVE) SCHEDULE OF TOPICS TO BE PRESENTED

- Course Description and Overview
- Estimation
 - Evaluating a point estimator
 - Confidence intervals

- Relative efficiency, consistency and sufficiency
- Rao-Blackwell Theorem
- Methods of moments and maximum likelihood
- Hypothesis testing
 - Some statistical tests
 - Significance level or p-value
 - Testing hypotheses about means and variances
 - Neyman-Pearson Lemma
 - Likelihood ratio tests
- Regression analysis
 - Linear models and method of least squares
 - Inferences about coefficients
 - Estimation and prediction
 - Correlation
 - Multiple linear regression and its inferences
- Experimental design.
 - Elements of experimental design
 - Matched pairs experiment
 - Elementary experimental designs

NOTE: For the final exam, please see Administration of Final Examinations During the Examination Period (<http://provost.gwu.edu/administration-final-examinations-during-examination-period>).

ASSIGNMENTS

Exercise assignments will be given according to the course progress.

GRADING

- Quizzes: 40%, closed book; weekly in class; two lowest quiz grades will be discarded.
- Midterm examination/presentation/project (to be announced): 30%.
- Final examination/presentation/project (to be announced): 30%.

The Blackboard System (<http://blackboard.gwu.edu/>) will be used for this course.

CLASS POLICIES

- Regular class attendance
- No early or make-up homework, quiz, exam, presentation or project
 - Except under highly extraordinary circumstances, in which a written request and related documentation must be submitted as early as possible

UNIVERSITY POLICIES

ACADEMIC INTEGRITY CODE

Academic integrity is an essential part of the educational process, and all members of the GW community take these matters very seriously. As the instructor of record for this course, my role is to provide clear expectations and uphold them in all assessments. Violations of academic integrity occur when students fail to cite research sources properly, engage in unauthorized collaboration, falsify data, and otherwise violate the Code of Academic Integrity. If you have any questions about whether or not particular academic practices or resources are permitted, you should ask me for clarification. If you are reported for an academic integrity violation, you should contact Student Rights and Responsibilities (SRR) to learn more about your rights and options in the

process. Consequences can range from failure of assignment to expulsion from the University and may include a transcript notation. For more information, please refer to the SRR website at studentconduct.gwu.edu/academic-integrity, email rights@gwu.edu, or call 202-994-6757.

UNIVERSITY POLICY ON OBSERVANCE OF RELIGIOUS HOLIDAYS

Students must notify faculty during the first week of the semester in which they are enrolled in the course, or as early as possible, but no later than three weeks prior to the absence, of their intention to be absent from class on their day(s) of religious observance. If the holiday falls within the first three weeks of class, the student must inform faculty in the first week of the semester. For details and policy, see “Religious Holidays” at provost.gwu.edu/policies-procedures-and-guidelines.

USE OF ELECTRONIC COURSE MATERIALS AND CLASS RECORDINGS

Students are encouraged to use electronic course materials, including recorded class sessions, for private personal use in connection with their academic program of study. Electronic course materials and recorded class sessions should not be shared or used for non-course related purposes unless express permission has been granted by the instructor. Students who impermissibly share any electronic course materials are subject to discipline under the Student Code of Conduct. Please contact the instructor if you have questions regarding what constitutes permissible or impermissible use of electronic course materials and/or recorded class sessions. Please contact Disability Support Services at disabilitysupport.gwu.edu if you have questions or need assistance in accessing electronic course materials.

ACADEMIC SUPPORT

Writing Center

GW’s Writing Center cultivates confident writers in the University community by facilitating collaborative, critical, and inclusive conversations at all stages of the writing process. Working alongside peer mentors, writers develop strategies to write independently in academic and public settings. Appointments can be booked online at gwu.mywconline.

Academic Commons

Academic Commons provides tutoring and other academic support resources to students in many courses. Students can schedule virtual one-on-one appointments or attend virtual drop-in sessions. Students may schedule an appointment, review the tutoring schedule, access other academic support resources, or obtain assistance at academiccommons.gwu.edu.

SUPPORT FOR STUDENTS OUTSIDE THE CLASSROOM

Disability Support Services (DSS) 202-994-8250

Any student who may need an accommodation based on the potential impact of a disability should contact Disability Support Services at disabilitysupport.gwu.edu to establish eligibility and to coordinate reasonable accommodations.

Counseling and Psychological Services 202-994-5300

GW’s Colonial Health Center offers counseling and psychological services, supporting mental health and personal development by collaborating directly with students to overcome challenges and difficulties that may interfere with academic, emotional, and personal success. healthcenter.gwu.edu/counseling-and-psychological-services.

Safety and Security

- Monitor GW Alerts and Campus Advisories to Stay Informed before and during an emergency event or situation
- In an emergency: call GWPD/EMeRG 202-994-6111 or 911
- For situation-specific actions: refer to GW's Emergency Response Handbook and Emergency Operations Plan
- In the event of an armed Intruder: Run. Hide. Fight.