

## **STAT 1051-12 Introduction to Business and Economic Statistics**

Course: STAT 1051 12

Semester: Spring 2024, 01/16 – 04/29

Time: MW, 06:10 - 07:25 PM; Location: Corcoran Hall, Room 101A

**INSTRUCTOR:** Dr. Zhenyu Rick Liu

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Office hours: MW 07:30 - 08:00 PM or by appointment

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Office hours: TBD

**TEXTBOOK:** Statistics by McClave and Sincich, 13th Edition, Prentice Hall Press.

Note: You will also need a scientific calculator with two-variable statistical functions such as TI-83 for the class. Calculators are allowed in all exams and quizzes.

**COURSE PREREQUISITE(S):** One entrance unit in algebra is prerequisite to all courses in statistics.

**COURSE COREQUISITE:** All students must also sign up for one of the corresponding Discussion Sections: Section 35 (CRN:92720) – F 12:45-01:35pm, Monroe Hall B33 OR Section 36 (CRN:92719) – F 09:35-10:25am, Tompkins Hall 302

**COURSE OBJECTIVE:** This is an introductory course of statistics for students with non-statistics major. We will cover the following topics: Describing data using summary statistics and graphics, probability, random variables, sampling distributions, estimation and hypothesis testing based on a single sample. If time permits, an introduction to simple linear regression will also be covered.

**Please note that Stat 1051, 1053, 1111 and 1127 are related in their subject matter, and credit for only one of them may be applied toward a degree.**

**AVERAGE MINIMUM AMOUNT OF OUT-OF-CLASS OR INDEPENDENT LEARNING EXPECTED PER WEEK:** In a 15-week semester, including exam week, students are expected to spend a minimum of 100 minutes of out-of-class work for every 50 minutes of direct instruction, for a minimum total of 2.5 hours a week. A 3- credit course should include 2.5 hours of direct instruction and a minimum of 5 hours of independent learning or 7.5 hours per week.

**COURSE CONTENT:** The course will cover the following materials:

1. Chapter 1 (Statistics, fundamental Elements of statistics, Types of Data & Statistical Thinking);

2. Chapter 2 (Methods of Describing Sets of Data – Graphical Presentations, Summary Statistics & Outliers);
3. Chapter 3 (Probability Theory – Sample Spaces, Events and computing probability of events & Probability Rules–Conditional Prob. & Bayes Rule);
4. Chapter 4 (Types of Random Variables (RV), Prob. Dist. Of Discrete RVs – computing expected and variance – Bernoulli and Binomial);
5. Chapter 5 (Continuous Random Variables– Normal distribution, Computing area under the curve – Approximation of Binomial Prob. With Normal Distribution);
6. Chapter 6 (Sampling Distributions – Distribution of sample mean – Central Limit Theorem – Distribution of Sample Proportions)
7. Chapter 7 (Parameter vs. Statistics; Inference about a Single Sample – Confidence Interval and sample size calculation for means and proportions);
8. Chapter 8 (Hypothesis Testing: mean and proportions – Null vs. Alternative Hypothesis; One Sided vs. Two Sided Alternatives; Types of Error – Critical Value(s) vs. P-values);
9. Chapter 9 (Hypothesis Testing: two mean and two proportions);
10. Chapter 11 (Simple Linear Regression: Pearson Correlation and estimating linear relationship using regression)

**LEARNING OUTCOMES:** At the end of the semester, the student be able to

- Familiar with the descriptive statistics
- Understand and apply basic probability and distribution theory
- Construct and interpret confidence intervals
- Conduct statistical testing to evaluate evidence for and against hypotheses.

### **GRADING**

- Homework (10%),
- Quizzes (20%),
- Midterm exam (20%),
- Data Analysis Project (20%),
- Final exam (30%).

**GRADING SCALE:** The grading scale for the course are as follows

< 60%: F; 60-69%: D; 70-79%: C; 80-89%: B; 90-100: A.

With “+” scores from \_7% through \_9% and “-” scores from \_0% through \_3%.

**HOMEWORK:** Homework problems will be assigned almost every week and collected the week later. No late homework will be accepted.

**QUIZZES:** Five quizzes will be given in class through the semester.

**DATA ANALYSIS PROJECT:** There will be a statistical analysis project, where you will team with another student, use the programming language **R (and RStudio)** software to analyze a dataset and conduct statistical inferences for some research questions, present your analysis and submit a report. The detailed guideline for the project will be given after the midterm exam.

**R** is available in all the labs at GWU and also can be accessed from the GWU cloud.

**MIDTERM EXAM:** A midterm exam covering the material in Chapters 1-4 will be given in class on 03/06.

**FINAL EXAM:** The final exam will be scheduled in the final exam week and will be cumulative but with more emphasis on topics discussed after the midterm exam.

### **CLASS POLICIES**

- A grade of INCOMPLETE will ONLY be given to a student who is passing the course and cannot complete the course due to illness or other well documented circumstances beyond his/her control.
- Attendance for the class is not mandatory but will be recorded throughout the semester for record. In my several years of experience, I have observed that students who do not come to classes regularly perform poorly in the exams and quizzes. If you are sending me emails regarding attendance, write the subject to be Attendance or Absence.
- Please check the blackboard frequently. Important information or announcement (homework, quizzes, projects, lecture notes, etc.) will be communicated there.
- There will be **NO** make-up quizzes/exams. Lowest HW/quiz score will be dropped.
- The midterm and final will be closed book. You are allowed a one-page handwritten note sheet for the midterm, and a two-page note sheet for the final.
- You will need a calculator to do the quizzes, exams, and in-class problems, so please bring a calculator to class.
- Students are not allowed to use laptops or other electronic devices during lecture unless asked to.

### **UNIVERSITY POLICIES:**

#### **OBSERVANCE OF RELIGIOUS HOLIDAYS**

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 their day(s) of religious observance. For details and policy, see: [students.gwu.edu/accommodations-religious-holidays](http://students.gwu.edu/accommodations-religious-holidays).

#### **ACADEMIC INTEGRITY**

I personally support the GW Code of Academic Integrity. It states: “Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information.” For the remainder of the code, see: <http://www.gwu.edu/~ntegrity/code.html>

## **SUPPORT FOR STUDENTS OUTSIDE THE CLASSROOM**

### **Disability Support Services (DSS)**

Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in the Rome Hall, Suite 102, to establish eligibility and to coordinate reasonable accommodations. For additional information see: [disabilitysupport.gwu.edu/](http://disabilitysupport.gwu.edu/)

### **Mental Health Services 202-994-5300**

The University's Mental Health Services offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. Services for students include: crisis and emergency mental health consultations confidential assessment, counseling services (individual and small group), and referrals. For additional information see: <http://gwired.gwu.edu/counsel/CounselingServices/AcademicSupportServices>

## **SAFETY AND SECURITY**

In the case of an emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, follow the evacuation procedures for the building. After evacuation, seek shelter at a predetermined rendezvous location.