暨南大學
JINAN UNIVERSITY

0701S201
Introduction to Statistics

Instructor: TBA

E-mail: TBA

Office Hours: by appointment

Contact Hours: By appointment

Credits: 4

Course Description

Statistics and probability constitute the mathematics of uncertainty. This is an introductory course that gives the students' knowledge on both descriptive and inferential statistics. Topics include graphic and numerical representations of various types of data; probability and statistics, discrete and continuous probability distributions; sampling and estimations; statistical inferences.

Course Goals

By the end of the course, students will be able to:

- **Module 1 (Introduction to Statistics) :** Students will be able to identify types of data, sampling methods, and study designs, and evaluate whether a study supports valid conclusions or causal claims.

- **Module 2 (Collecting Data Sensibly):** Students will be able to design and evaluate data collection methods, identify potential sources of bias, and explain how sampling and study design affect the quality and reliability of data.
- **Module 3 (Graphical Methods for describing Data):** Students will be able to construct and interpret graphical displays of data, such as histograms, dotplots, and boxplots, to describe the shape, center, spread, and potential outliers of a dataset.
- **Module 4 (Describing Data):** Students will be able to calculate and interpret numerical summaries of data, including measures of center and variability, and select appropriate summaries based on the shape of a distribution and the presence of outliers.
- **Module 5 (Bivariate Data):** Students will be able to use graphical and numerical methods to describe relationships between two quantitative variables, interpret scatterplots and correlation, and explain the distinction between association and causation.
- **Module 6 (Probability):** Students will be able to apply basic probability rules, including complements, unions, intersections, and conditional probability, to analyze random phenomena and assess independence between events.
- **Module 7** (Random Variables and Probability Distributions): Students will be able to define and work with discrete and continuous random variables, construct and interpret probability distributions, and compute and interpret expected values and measures of variability.
- **Module 8 (Confidence Intervals):** Students will be able to construct and interpret confidence intervals to estimate population parameters with quantifiable uncertainty.

- **Module 9 (Inference for Two Groups):** Students will be able to compare two populations using appropriate statistical inference procedures and interpret results in context.

Required Textbook(s)

Introduction to Statistics and Data Analysis, Peck, Olsen and Devore, 3rd edition, Brooks/Cole.

Prerequisites

College Algebra

Course Outline

Please note that the outline is meant to give an overview of the major concepts in this course. Changes may occur as needed to aid in the student`s development.

Module 1: Introduction to Statistics (Chapter 1)

- What is statistics?
- Populations, samples, variables
- Types of data
- Observational vs. experimental studies
- Sampling designs (simple random, stratified, cluster, systematic)
- Bias and survey pitfalls

Homework 1

Quiz 1

Module 2: Collecting Data Sensibly (Chapter 2)

- Types of data and variables (categorical vs. quantitative)
- Populations, samples, and parameters vs. statistics
- Sampling methods and sources of bias
- Observational studies versus experiments
- Principles of good study design and data collection

Homework 2

Quiz 2

Module 3: Graphical Methods for Describing Data (Chapter 3)

- Dotplots and stem-and-leaf displays
- Histograms and frequency distributions
- Bar charts, pie charts, and time series plots
- Identifying shape, center, spread, and outliers from graphs
- Recognizing misleading or poorly constructed graphs

Homework 3

Quiz 3

Module 4: Numerical Methods for Describing Data (Chapter 4)

- Measures of center (mean, median, mode)
- Measures of variability (range, variance, standard deviation, IQR)
- Percentiles, quartiles, and the five-number summary

- Identifying and interpreting outliers numerically
- Choosing appropriate numerical summaries for different distributions

Homework 4

Quiz 4

Module 5: Summarizing Bivariate Data (Chapter 5)

- Scatterplots and interpretation of association
- Direction, strength, and form of relationships
- Correlation and its properties
- Cautions about interpretation, including association vs. causation

Homework 5

Quiz 5

Midterm Exam

Module 6: Probability (Chapter 6)

- Basic probability concepts and sample spaces
- Probability rules, including complements and unions
- Disjoint and independent events
- Conditional probability
- Tree diagrams and probability for compound events

Homework 6

Quiz 6

Module 7: Random Variables and Probability Distributions (Chapter 7)

- Definition of random variables
- Discrete versus continuous random variables
- Probability distributions and distribution properties
- Expected value, variance, and standard deviation
- Common discrete distributions and interpretation

Homework 7

Quiz 7

Module 8: Confidence Intervals (Chapter 9)

- Confidence intervals for population means (z and t)
- Confidence intervals for population proportions
- Interpreting confidence level and confidence intervals
- Choosing sample size

Homework 8

Quiz 8

Module 9: Simple Linear Regression, Correlation and Inference for Two Groups (Chapter 13)

- Review of correlation and linear association
- Simple linear regression models and interpretation
- Least-squares regression line and residuals
- Using regression for prediction and the risks of extrapolation
- Interpreting regression results and correlation with caution

- Comparing group means and proportions

Homework 9

Quiz 9

Final Exam

Grading Policy

Homework	23%
Module Quizzes	36%
Midterm	11%
Final exam	30%
Total	**100%**

Grading Scale

The instructor will use the grading system as applied by JNU:

Definition	Letter Grade	Score
Excellent	A	90~100
Good	B	80~89
Satisfactory	C	70~79
Poor	D	60~69
Failed	E	Below 60

Academic Integrity

As members of the Jinan University academic community, students are expected to be honest in all of their academic coursework and activities. Academic dishonesty, includes (but is not limited to) cheating on assignments or examinations; plagiarizing, i.e., misrepresenting as one's own work any work done by another; submitting the same paper, or a substantially similar paper, to meet the requirements of more than

one course without the approval and consent of the instructors concerned; or sabotaging other students` work within these general definitions. Instructors, however, determine what constitutes academic misconduct in the courses they teach. Students found guilty of academic misconduct in any portion of the academic work face penalties that range from the lowering of their course grade to awarding a grade of E for the entire course.