暨南大學 JINAN UNIVERSITY

Summer 2023

0701S303
Applied Linear Statistical Models

Instructor: TBA

Time: May 8, 2023 - June 9, 2023

Office Hours: 2 hours (according to the teaching schedule)

Contact Hours: 60 (50 minutes each)

Credits: 4

Course Description

This course introduces the Linear models and their application to empirical data. Including The general linear model; ordinary-least-squares estimation; diagnostics, including departures from underlying assumptions, detection of outliners, effects of influential observations, and leverage; analysis of variance, including one-way and two-way layouts; analysis of covariance et. Practical analysis of introduced models using R is also covered.

Textbook(s)

Required: *STAT2: Modeling with Regression and ANOVA*, 2ed, by Ann R. Cannon, George W. Cobb. ISBN-13: 978-1319054076.

Advanced: *Linear Regression Analysis, 2ed, by George A. F. Seber, Alan J. Lee.* ISBN: 9780471415404.

Calculator: you are required to have a scientific non-programmable calculator to this class.

Prerequisites

0701S201 Introduction to Statistics or equivalent.

Course Schedule

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

Week 1:

- Course Introduction
- 1.1 The Simple Linear Regression Model
- 1.2 Conditions for a Simple Linear Model
- 1.3 Assessing Conditions
- 1.4 Transformations/Reexpressions
- 1.5 Outliers and Influential Points
- 2.1 Inference for Regression Slope

Week 2

- 2.2 Partitioning Variability—ANOVA
- 2.3 Regression and Correlation 2.4 Intervals for Predictions
- 2.5 Case Study: Butterfly Wings
- 3.1 Multiple Linear Regression Model
- 3.2 Assessing a Multiple Regression Model
- 3.3 Comparing Two Regression Lines
- 3.4 New Predictors from Old

Week 3

- 3.5 Correlated Predictors
- 3.6 Testing Subsets of Predictors
- 3.7 Case Study: Predicting in Retail Clothing with R
- 4.1 Topic: Added Variable Plots
- 4.2 Topic: Techniques for Choosing Predictors
- 4.4 Topic: Identifying Unusual Points in Regression

- 4.5 Topic: Coding Categorical Predictors
- Mid-term Exam
- Group project

Week 4

- 5.1 Overview of ANOVA
- 5.2 The One-way Randomized Experiment and Its Observational Sibling
- 5.3 Fitting the Model
- 5.4 Formal Inference: Assessing and Using the Model
- 5.5 How Big Is the Effect?: Confidence Intervals and Effect Sizes
- 5.6 Using Plots to Help Choose a Scale for the Response
- 5.7 Multiple Comparisons and Fisher's Least Significant Difference
- 5.8 Case Study: Words with Friends with R
- 6.1 Choose: RCB Design and Its Observational Relatives
- 6.2 Exploring Data from Block Designs
- 6.3 Fitting the Model for a Block Design

Week 5

- 6.4 Assessing the Model for a Block Design
- 6.5 Using the Model for a Block Design
- 7.1 Interaction
- 7.2 Design: The Two-way Factorial Experiment
- 7.3 Exploring Two-way Data
- 7.4 Fitting a Two-way Balanced ANOVA Model
- 7.5 Assessing Fit: Do We Need a Transformation?
- 7.6 USING a Two-way ANOVA Model
- Final Exam

Grading Policy

Midterm exam	20%
Homework	40%
Group project	20%
Final exam	20%

Homework will be given at each week for the first four weeks and due on the next Monday. Group project will be given right after midterm exam. Students are expected to work in group for the project and submit a report with all partners' names on it before final exam. Calculation could be done either by calculator or R.

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.