MATHEMATICAL STATISTICS WITH COMPUTING (STQD6214)
SEMESTER I: ACADEMIC YEAR 2024/2025

Name and Course Code: Mathematical Statistics with Computing, STQD 6214

Lecture Time and Place: Sunday (9.00am – 1.00pm)
Beta Computer Lab

Lecturers: Dr. Muhammad Hilmi Abdul Majid
Assoc. Prof. Dr. Noratiqah Mohd Ariff

E-mail: hilmi.majid@ukm.edu.my
tqah@ukm.edu.my

Course Evaluation:

- Assignments 20%
- Presentation 10%
- Mid Semester Test 30%
- Final Exam 40%

Short synopsis:
This course aims to expose students to the fundamentals of mathematical statistics including descriptive statistics, graphical displays, sampling distributions, hypothesis testing and other methods in data analysis. This course also reflects the integral role of R in computing statistical problems. Basic simulation concepts are discussed with examples. Students will learn how to generate data, analyze data using statistical methods and interpret the results obtained.

Reference Books:

1. Bluman A.G. 2023. *Elementary Statistics: A Step By Step Approach*. 11th Ed. McGraw-Hill Education.
2. Bruce, P., Andrew B., & Peter G. 2020. *Practical statistics for data scientists: 50+ essential concepts using R and Python*. 2nd Ed. O'Reilly Media.
3. James, G., Witten, D., Hastie, T., & Tibshirani, R. 2021. *An Introduction to Statistical Learning with Applications in R*. 2nd Ed. Springer.
4. Mann P.S. 2020. *Introductory Statistics*. 10th Ed. John Wiley & Sons.
5. Nady, M. 2022. *Introduction to R Programming Language*. Arcler Press.

Course Learning Outcomes: After attending this course, students should be:

1. Able to understand the basic statistical concepts and relate them to real world problem.
2. Able to solve statistical computing problems using R.
3. Able to estimate statistical parameters and simulate the distributions for data driven problems.
4. Able to validate analysis using statistical testing.

Planned Course Contents

Lectures	Contents	Lecturer
Week 1 20/10	Introduction to Statistics, Types of Data, and Organizing Data	Dr. Muhammad Hilmi Abdul Majid
Week 2 27/10	Numerical Descriptive Measures	
Week 3 3/11	Probability	
Week 4 10/11	Discrete Random Variables	
Week 5 17/11	Continuous Random Variables and Sampling Distributions	
Week 6 24/11	Hypothesis Testing	
Week 7 1/12	Regression Analysis	
Week 8 7/12 – 8/12	**MID SEMESTER BREAK**	
Week 9 15/12	Introduction to R	Assoc. Prof. Dr. Noratiqah Mohd Ariff
Week 10 22/12	Data Exploration with R	
Week 11 29/12	Data Visualization with R	
Week 12 5/1	Statistical Analysis with R	
Week 13 12/1	Programming with R	
Week 14 19/1	Monte Carlo Methods	
Week 15 26/1	Case Studies	
27/1 – 2/2	**STUDY WEEK**	
3/2 – 23/2	**FINAL EXAM**	