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

Dr. Muhammad Hilmi Abdul Majid **Lecturers**:

Assoc. Prof. Dr. Noratiqah Mohd Ariff

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Course Evaluation: 20% Assignments

> Presentation 10% 30% Mid Semester Test 40% • Final Exam

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.
- Bruce, P., Andrew B., & Peter G. 2020. Practical statistics for data scientists: 50+ essential concepts using R and Python. 2nd Ed. O'Reilly Media.
- 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.
- 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	
Week 2	Numerical Descriptive Measures	Dr. Muhammad Hilmi Abdul Majid
27/10		
Week 3	Probability	
3/11		
Week 4	Discrete Random Variables	
10/11		
Week 5	Continuous Random Variables and	
17/11	Sampling Distributions	
Week 6	Hypothesis Testing	
24/11	Trypothesis Testing	
Week 7	Regression Analysis	
1/12		
Week 8	MID SEMESTER BREAK	
7/12 – 8/12		
Week 9	Introduction to R	Assoc. Prof. Dr. Noratiqah Mohd Ariff
15/12		
Week 10	Data Exploration with R	
22/12		
Week 11	Data Visualization with R	
29/12		
Week 12	Statistical Analysis with R	
5/1 Week 13	Programming with R	
12/1		
Week 14	Monte Carlo Methods	
19/1		
Week 15		
26/1	Case Studies	
27/1 – 2/2	STUDY WEEK	
3/2 – 23/2	FINAL EXAM	