Course Syllabus

offered by Department of Mathematics
with effect from Semester A 2022/23

Part I Course Overview

Course Title:	Linear Models
Course Code:	MA8027
Course Duration:	1 semester
Credit Units:	3 CUs
Level:	R8
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: *(Course Code and Title)*	Nil
Precursors: *(Course Code and Title)*	Nil
Equivalent Courses: *(Course Code and Title)*	Nil
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

Linear Models are among the most important statistical models, with deep theoretical aspects and methodologies, and wide range of application. This course details the statistical inference of linear models including parameter estimation, hypothesis testing, confidence intervals, and prediction, such as the linear regression model, the analysis of variance model, the analysis of covariance model, and the variance components model.

2. Course Intended Learning Outcomes (CILOs)

No.	CILOs[#]	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	Be familiar with matrix algebra and generalized inverse of matrices	20%	✔	✔	
2.	Understand key results in general multiple linear models, be able to carry out point estimation and hypothesis testing in linear model	40%	✔	✔	
3.	Understand analysis of covariance model and variance components model, can derive the key theories, and can carry out analysis of real data	40%	✔	✔	✔
…					
		100%			

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: *Accomplishments*
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Teaching and Learning Activities (TLAs)

TLA	Brief Description	CILO No.						Hours/week (if applicable)
		1	2	3	4			
Teaching	Learning through teaching is primarily based on lectures.	✔	✔	✔				3 hours/week
Assignments	Including exercises on theory and application.	✔	✔	✔				
…								

4. Assessment Tasks/Activities (ATs)

Assessment Tasks/Activities	CILO No.						Weighting*	Remarks
	1	2	3	4				
Continuous Assessment: _50___%								
Assignment	✔	✔	✔				20%	
Midterm quiz	✔	✔	✔				30%	
Examination: __50__% (duration: 3 hours , if applicable)								
							100%	

5. Assessment Rubrics

Applicable to students admitted in Semester A 2022/23 and thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-,C+,C)	Failure (F)
1. Assignments	Ability in problem solving	High	Significant	Basic	Not even reaching marginal levels
2. Midterm	Problem solving based on comprehensive understanding	High	Significant	Basic	Not even reaching marginal levels
3. Examination	Problem solving based on comprehensive understanding	High	Significant	Basic	Not even reaching marginal levels

Applicable to students admitted before Semester A 2022/23

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Assignments	Ability in problem solving	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Midterm	Problem solving based on comprehensive understanding	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Examination	Problem solving based on comprehensive understanding	High	Significant	Moderate	Basic	Not even reaching marginal levels

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

Linear models; Point estimation; Hypothesis testing; Confidence intervals; Variance model, Covariance model; Variance components model.

2. Reading List

2.1 Compulsory Readings

1.	Wang Songgui, Shi Jianhong, Yin Suju and Wu Mixia, Introduction to Linear Models. Science Press(2004)
2.	
3.	
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2.2 Additional Readings

1.	Rao, C. R. and Toutenburg, H., Linear Models, Springer-Verlag, 1995.
2.	Rao, C. R., Linear Statistical Inference and Its Applications, second edition, John Wiley & Sons, 1973.
3.	
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