City University of Hong Kong
Course Syllabus

offered by Department of Biostatistics
with effect from Semester A 2023/24

Part I   Course Overview

Course Title: Selected Topics in Biostatistics

Course Code: BIOS8005

Course Duration: One Semester

Credit Units: 3

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

The course aims to introduce research students to one active, advanced and specialized field in Biostatistics (e.g. causal inference, genomic analysis, high-dimensional data analysis, post-model selection, reinforcement learning, survival analysis, time series analysis, etc.). It will help students to develop a solid and comprehensive understanding of the fundamental concepts, methods and theories in the chosen field and equip them with necessary techniques and knowledge for conducting independent and innovative research.

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.	Explain the fundamental concepts and methods.	20%	✓	✓	
2.	Develop a solid understanding of the techniques.	20%	✓	✓	
3.	Conduct a thorough reading of the literature and know current state-of-the-art tools.	20%	✓	✓	✓
4.	Apply the techniques and methods to real data applications.	20%	✓	✓	✓
5.	Develop independent research skills and abilities	10%	✓	✓	✓
6.	Effectively communicate and present research results	10%	✓	✓	✓
		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	5	6	
Lectures	Learning through teaching is primarily based on lectures	✓	✓	✓	✓	✓	✓	3 hours/week
Assignments	Learning though take-home assignments helps students understand the key concepts and acquire the techniques	✓	✓	✓	✓	✓	✓	After class

4. Assessment Tasks/Activities (ATs)

Assessment Tasks/Activities	CILO No.						Weighting*	Remarks
	1	2	3	4	5	6		
Continuous Assessment: 50%								
Assignments	✓	✓	✓	✓			30%	Help to train students with basic knowledge, concepts, and analysis techniques
Midterm/quizzes	✓	✓	✓	✓	✓	✓	20%	Test students' capabilities in applying the knowledge to solve relevant problems
Examination: 50% (duration: 3 hours)	✓	✓	✓	✓	✓	✓	50%	Examination questions are designed to see how well students have achieved the learning objectives and acquired the requisite techniques for problem-solving
							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	Problem solving skills	High	Significant	Moderate	Not even reaching marginal levels
2. Midterm/quizzes	Problem solving based on comprehensive understanding	High	Significant	Moderate	Not even reaching marginal levels
3. Examination	Problem solving based on comprehensive understanding	High	Significant	Moderate	Not even reaching marginal levels

Part III   Other Information

1.   Keyword Syllabus

Causal inference, genomic analysis, high-dimensional data analysis, post-model selection, reinforcement learning, survival analysis, time series analysis

2.   Reading List
2.1   Compulsory Readings

Nil.

2.2   Additional Readings

1.	Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction (Cambridge University Press; 1st edition), by Guido W. Imbens and Donald B. Rubin
2.	High-Dimensional Statistics (Cambridge University Press), by Martin J. Wainwright