City University of Hong Kong
Course Syllabus

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

Part I   Course Overview

Course Title:	**Advanced Methods in Biostatistics**
Course Code:	**BIOS5802**
Course Duration:	**1 semester**
Credit Units:	**3 CUs**
Level:	**P5**
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**

This course aims to provide students with the tools to carry out regression analyses involving non-continuous (e.g., binary or count-valued) responses, correlated observations, and censored data. Topics covered include: generalized linear models (GLM) for non-Gaussian response, mixed-effects models and generalized estimating equations (GEE) for correlated observations, longitudinal data analysis, and Cox proportional hazards models for the analysis of survival time outcomes. Examples are drawn from public health and the biomedical sciences.

2. **Course Intended Learning Outcomes (CILOs)**
(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	Understand regression models for discrete responses	40%	√	√	
2.	Ability to develop and fit regression models that adjust for correlated data and censored observations	40%	√	√	√
3.	Appreciate the relevance of regression modelling in public health	20%	√	√	√
		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)
(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No. 1	2	3	Hours/week (if applicable)
Teaching	Learning through teaching based on lectures	√	√	√	3 hours/ week
Assignments	Learning through assignments allows students to perform critical problem analysis and develop hands-on skills involving regression modelling	√	√	√	

4. Assessment Tasks/Activities (ATs)
(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No. 1	2	3	Weighting	Remarks
Continuous Assessment: 60%					
Assignments	√	√	√	30%	
Midterm/quiz	√	√	√	30%	
Examination: 40%					
Examination (duration: 2 hours)	√	√	√	40%	
				100%	

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following 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. Assignment	Problem solving skills	High	Significant	Moderate	Not even reaching marginal level
2. Midterm/quizzes	Problem solving based on comprehensive understanding	High	Significant	Moderate	Not even reaching marginal level
3. Examination	Problem solving based on comprehensive understanding	High	Significant	Moderate	Not even reaching marginal level

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

1. **Keyword Syllabus**
    (An indication of the key topics of the course.)

    Generalized linear models, correlated observations, censored data, longitudinal data.

2. **Reading List**
2.1 **Compulsory Readings**
    (Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	Analysis of Longitudinal Data (Oxford Statistical Science Series) 2nd Edition by Peter Diggle, Patrick Heagerty, K.Y. Liang, and Scott Zeger

2.2 **Additional Readings**
    (Additional references for students to learn to expand their knowledge about the subject.)

1.	Generalized Linear Models with Examples in R (Springer Texts in Statistics) by Dunn and Smyth
2.	Applied Survival Analysis Using R by Dirk F. Moore