City University of Hong Kong
Course Syllabus

offered by Department of Infectious Diseases and Public Health
with effect from Semester A 2024/25

Part I   Course Overview

Course Title: Intermediate Level Statistics for One Health

Course Code: PH6205

Course Duration: 1 semester

Credit Units: 3 credits

Level: P6

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 will build on the introduction to Biostatistics in One Health. It will cover applied aspects of regression and logistic regression models with an introduction to the inclusion of random variables.   We will focus on building these models using the software STATA and biological interpretation of the results from these analyses. We will also introduce count data and appropriate analyses for these types of data as well as a brief introduction to survival analysis.

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.	Explain when and how to build different types of regression models (linear and logistic) using data from observational or experimental studies.		✓	✓	
2.	Explain how to assess model fit for linear regression and logistic regression models with multiple variables, including random effects		✓	✓	
3.	Analyse and interpret results from mixed logistic and linear regression models		✓	✓	✓
4.	Describe when and how to analyse basic survival data		✓	✓	✓
		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 real-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. Learning and Teaching Activities (LTAs)
(LTAs designed to facilitate students' achievement of the CILOs.)

LTA	Brief Description	CILO No.						Hours/week (if applicable)
		1	2	3	4			
Lectures	Students will receive lectures on the applied concepts in the use and interpretation of mixed linear and logistic regression models as well as an introduction to survival analysis.	✓	✓	✓	✓			4 hours /week
Hands-on practical tasks	Students will engage in hands-on, problem-based group activities using STATA to facilitate conceptual understanding.		✓	✓	✓			2-3 hours/week
Take-home assignment	Students will be provided with 1 take home assignments in conjunction with the in-class practical projects.		✓	✓				Out of classroom

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

Assessment Tasks/Activities	CILO No.						Weighting	Remarks
	1	2	3	4				
Continuous Assessment: 65%								
Homework	✓	✓	✓	✓			30%	Homework will be assigned for each topic, consisting both methodological and practical exercises.
Mid-term examination	✓	✓	✓	✓			35%	This will cover topics of the first part of the semester.
Examination: 35% (duration:2 hours)								
							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 before Semester A 2022/23 and in Semester A 2024/25 & thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Homework	Demonstrate the appropriate use and accurate interpretation of results from different statistical methods	High	Significant	Moderate	Basic	Not reaching basic levels
2. Mid-term examination	Apply the statistical methods covered in the first part of the course and analyze the interpretation of results from these models.	High	Significant	Moderate	Basic	Not reaching basic levels
3. Final examination	Apply the statistical methods covered in the second part of the course and analyze the interpretation of results from these models.	High	Significant	Moderate	Basic	Not reaching basic levels

Applicable to students admitted from Semester A 2022/23 to Summer Term 2024

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Homework	Demonstrate understanding of when to use and how to interpret results of different methods.	High	Significant	Moderate	Not even reaching marginal levels
2. Mid-term examination	The comprehension of the use and of the statistical methods covered in the first part of the course and interpretation of results from these models.	High	Significant	Moderate	Not even reaching marginal levels

3. Final examination	The comprehension of the use and of the statistical methods covered in the second part of the course and interpretation of results from these models.	High	Significant	Moderate	Not even reaching marginal levels

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.)

    Epidemiology; Mixed linear regression models, Mixed logistic regression models, Count data analysis, Survival analysis

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.	Dohoo, Ian Robert, S. Wayne Martin, and Henrik Stryhn. 2012. Methods in Epidemiologic Research. Charlottetown, P.E.I.: VER, Inc. Chapter 14 – 23.
2.	Eric Vittinghoff, David V. Glidden, Stephen C. Shiboski, and Charles E. McCulloch (2012) Regression Methods in Biostatistics: Linear, Logistic, Survival, and Repeated Measures Models, Second Edition, Springer

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

1.	Penelope Webb, Chris Bain, Andrew Page (2020) Essential Epidemiology - An Introduction for Students and Health Professionals, Fourth edition. Cambridge.
2.	Svend Juul and Morten Frydenberg (2021) An Introduction to Stata for Health Researchers, Fourth edition, Stata Press.
3.	Erick Suárez, Cynthia M. Pérez, Roberto Rivera, Melissa N. Martínez (2017) Applications of Regression Models in Epidemiology. Wiley.
4.	Frank E. Harrell, Jr. (2015) Regression Modelling Strategies With Applications to Linear Models, Logistic and Ordinal Regression, and Survival Analysis
5.	David W. Hosmer Jr., Stanley Lemeshow, Rodney X. Sturdivant (2013) Applied Logistic Regression, Third Edition. Wiley.
6.	Sophia Rabe-Hesketh and Anders Skrondal (2022) Multilevel and Longitudinal Modelling Using Stata, Volumes I and II Volume I: Continuous Responses Volume II: Categorical Responses, Counts, and Survival. Fourth edition, Stata Press.
7.	David G. Kleinbaum, Mitchel Klein (2012) Survival Analysis: A Self-Learning Text, Third Edition. Springer Link.
8.	David W. Hosmer Jr., Stanley Lemeshow, Susanne May (2008) Applied Survival Analysis Regression Modeling of Time-to-Event Data. 2nd edition. Wiley.
9.	Kenneth J. Rothman, Sander Greenland, Timothy L. Lash (2008) Modern epidemiology. Third Edition. Lippincott Williams & Wilkins, Philadelphia
10.	David G. Kleinbaum (2013) Applied regression analysis and other multivariable methods. 5th ed. Belmont, CA: Brooks/Cole
11.	Alastair H. Leyland and Peter P. Groenewegen (2020). Multilevel Modelling for Public Health and Health Services Research. Springer (Multilevel Modelling for Public Health and Health Services Research: Health in Context | SpringerLink).