

PH6205: INTERMEDIATE LEVEL STATISTICS FOR ONE HEALTH

Effective Term

Semester B 2024/25

Part I Course Overview

Course Title

Intermediate Level Statistics for One Health

Subject Code

PH - Infectious Diseases and Public Health

Course Number

6205

Academic Unit

Infectious Diseases and Public Health (PH)

College/School

Jockey Club College of Veterinary Medicine and Life Sciences (VM)

Course Duration

One Semester

Credit Units

3

Level

P5, P6 - Postgraduate Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

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.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if DEC-A1 app.)		DEC-A2	DEC-A3
1	Explain when and how to build different types of regression models (linear and logistic) using data from observational or experimental studies .		x	x	
2	Explain how to assess model fit for linear regression and logistic regression models with multiple variables including random effects		x	x	
3	Analyse and interpret results from mixed logistic and linear regression models		x	x	x
4	Describe when and how to analyse basic survival data		x	x	x

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.

Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	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 .	1, 2, 3, 4	4 hours /week
2	Hands-on practical tasks	Students will engage in hands-on problem-based group activities using STATA to facilitate conceptual understanding.	2, 3, 4	2-3 hours/week

3	Take-home assignment	Students will be provided with 1 take home assignments in conjunction with the in-class practical projects.	2, 3	Out of classroom
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Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Homework	1, 2, 3, 4	30	Homework will be assigned for each topic, consisting both methodological and practical exercises.
2	Mid-term examination	1, 2, 3, 4	35	This will cover topics of the first part of the semester.

Continuous Assessment (%)

65

Examination (%)

35

Examination Duration (Hours)

2

Assessment Rubrics (AR)

Assessment Task

Homework (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Demonstrate the appropriate use and accurate interpretation of results from different statistical methods

Excellent

(A+, A, A-) High

Good

(B+, B, B-) Significant

Fair

(C+, C, C-) Moderate

Marginal

(D) Basic

Failure

(F) Not reaching basic levels

Assessment Task

Mid-term examination (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Apply the statistical methods covered in the first part of the course and analyze the interpretation of results from these models .

Excellent

(A+, A, A-) High

Good

(B+, B, B-) Significant

Fair

(C+, C, C-) Moderate

Marginal

(D) Basic

Failure

(F) Not reaching basic levels

Assessment Task

Final examination (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Apply the statistical methods covered in the second part of the course and analyze the interpretation of results from these models .

Excellent

(A+, A, A-) High

Good

(B+, B, B-) Significant

Fair

(C+, C, C-) Moderate

Marginal

(D) Basic

Failure

(F) Not reaching basic levels

Assessment Task

Homework (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Demonstrate understanding of when to use and how to interpret results of different methods.

Excellent

(A+, A, A-) High

Good

(B+, B) Significant

Marginal

(B-, C+, C) Moderate

Failure

(F) Not even reaching marginal levels

Assessment Task

Mid-term examination (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

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.

Excellent

(A+, A, A-) High

Good

(B+, B) Significant

Marginal

(B-, C+, C) Moderate

Failure

(F) Not even reaching marginal levels

Assessment Task

Final examination (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

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.

Excellent

(A+, A, A-) High

Good

(B+, B) Significant

Marginal

(B-, C+, C) Moderate

Failure

(F) Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

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

Reading List

Compulsory Readings

Title	
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

Additional Readings

Title	
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).