BIOS5801: STATISTICAL COMPUTING

Effective Term
Semester B 2024/25

Part I Course Overview

Course Title
Statistical Computing

Subject Code
BIOS - Biostatistics
Course Number
5801

Academic Unit
Biostatistics (BIOS)

College/School
College of Computing (CC)

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
Contemporary biostatistics and data analysis depend on a mastery of tools for computation, visualization, dissemination, and reproducibility, in addition to proficiency in traditional statistical techniques. The goal of this course is to provide

training in the elements of a complete pipeline for data analysis using R. It is targeted to students with some data analysis experience.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Understand the importance of visualization, dissemination and reproducibility in data analysis	40	x	x	
2	Ability to provide a complete pipeline for data analysis using R	40	x	x	x
3	Appreciate the relevance of statistical computing for applications in public health	20	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	Teaching	Learning through teaching based on lectures	1, 2, 3	3 hours/ week
2	Assignments	Learning through assignments allows students to develop hands-on skills involving data analysis using R	1, 2, 3	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Assignments	1, 2, 3	30	
2	Project	1, 2, 3	30	

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

2

Assessment Rubrics (AR)

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

Criterion
Problem solving skills

Excellent
(A+, A, A-) Consistently demonstrates a thorough understanding of data analysis and strong ability to solve problems using R

Good
(B+, B, B-) Adequately demonstrates an understanding of data analysis using R and ability to solve problems using R

Fair
(C+, C, C-) Demonstrates some understanding of data analysis by using R to solve simple problems

Marginal
(D) Demonstrates some understanding of data analysis but cannot apply R to solve simple problems

Failure
(F) Demonstrates little understanding of data analysis using R and is unable to apply them to problems

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

Criterion
Problem solving based on comprehensive understanding

Excellent
(A+, A, A-) Demonstrates a comprehensive understanding of data analysis and strong ability in applying R to solve relevant problems in public health

Good
(B+, B, B-) Adequately demonstrates an understanding of data analysis and ability in applying R to solve relevant problems in public health

Fair
(C+, C, C-) Demonstrates some understanding of data analysis and little ability to solve simple problems with limited success

Marginal
(D) Demonstrates some understanding of data analysis but cannot apply R to solve simple problems

Failure
(F) Inappropriately or unable to apply data analysis using R to solve problems

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

Criterion

Problem solving based on comprehensive understanding

Excellent

(A+, A, A-) Consistently demonstrates a comprehensive understanding of data analysis and strong ability in applying relevant functions in R to solve complex problems in public health

Good

(B+, B, B-) Adequately demonstrates an understanding of data analysis and ability in applying relevant functions in R to solve complex problems in public health

Fair

(C+, C, C-) Demonstrates some understanding of data analysis and ability in using R to solve simple problems

Marginal

(D) Demonstrates some understanding of data analysis using R and limited ability in using R to solve simple problems

Failure

(F) Demonstrates little understanding of data analysis using R and is unable to apply them to problems

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Assessment Task

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

Criterion

Problem solving skills

Excellent

(A+, A, A-) Consistently demonstrates a thorough understanding of data analysis and strong ability to solve problems using R

Good

(B+, B) Adequately demonstrates an understanding of data analysis using R and ability to solve problems using R

Marginal

(B-, C+, C) Demonstrates some understanding of data analysis by using R to solve simple problems

Failure

(F) Demonstrates little understanding of data analysis using R and is unable to apply them to problems

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Assessment Task

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

Criterion

Problem solving based on comprehensive understanding

Excellent

(A+, A, A-) Demonstrates a comprehensive understanding of data analysis and strong ability in applying R to solve relevant problems in public health

Good

(B+, B) Adequately demonstrates an understanding of data analysis and ability in applying R to solve relevant problems in public health

Marginal

(B-, C+, C) Demonstrates some understanding of data analysis and little ability to solve simple problems with limited success

Failure

(F) Inappropriately or unable to apply data analysis using R to solve problems

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Assessment Task

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

Criterion

Problem solving based on comprehensive understanding

Excellent

(A+, A, A-) Consistently demonstrates a comprehensive understanding of data analysis and strong ability in applying relevant functions in R to solve complex problems in public health

Good

(B+, B) Adequately demonstrates an understanding of data analysis and ability in applying relevant functions in R to solve complex problems in public health

Marginal

(B-, C+, C) Demonstrates some understanding of data analysis and ability in using R to solve simple problems

Failure

(F) Demonstrates little understanding of data analysis using R and is unable to apply them to problems

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Part III Other Information

Keyword Syllabus

Visualization, dissemination and reproducibility for data analysis using R.

Reading List

Compulsory Readings

	Title
1	R for Data Science: Import, Tidy, Transform, Visualize, and Model Data by Hadley Wickham and Garrett Grolemund

Additional Readings

	Title
1	Nil