

BMS2901: INTRODUCTORY BIOSTATISTICS AND DATA ANALYSIS

Effective Term

Semester A 2022/23

Part I Course Overview

Course Title

Introductory Biostatistics and Data Analysis

Subject Code

BMS - Biomedical Sciences

Course Number

2901

Academic Unit

Biomedical Sciences (BMS)

College/School

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

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

BMS1901 Calculus For Life Sciences, or
MA1200 Calculus and Basic Linear Algebra 1 & MA1201 Calculus and Basic Linear Algebra II, or
MA1300 Enhanced Calculus and Linear Algebra 1 & MA1301 Enhanced Calculus and Linear Algebra II

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course aims to introduce concepts and methods of statistical analysis particularly those occurring in biomedical or biological sciences. The objective is to solve some practical issues in biomedical or biological sciences using statistical methods. Topics include descriptive measures, tests of hypotheses, significance tests, confidence levels, correlation, regression, chi-square tests and analysis of variance.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Introduce statistics and its utility in biological and biomedical scientific context	20	x		
2	Develop analytical skills involving distributions and measures of central tendency and spread	10		x	
3	Understand the concepts of estimation and confidence intervals and how they are used in statistical inference	20	x	x	
4	Perform hypotheses tests and to interpret results for data sets	30		x	x
5	Apply statistical methods to a range of problems	20		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.

Teaching and Learning Activities (TLAs)

TLAs	Brief Description	CILO No.	Hours/week (if applicable)	
1	Lectures	Learning through teaching is primarily based on lectures	1, 2, 3, 4, 5	2 hours per week
2	Lab Sessions	Learning through lab sessions is primarily based on hands-on statistical problem solving allowing interaction	1, 2, 3, 4, 5	2 - 3 hours

3	Lab Sessions	Learning through take-home assignments to understand basic concepts, statistical methods and some related applications in biomedical and biological sciences.	1, 2, 3, 4, 5	After class
---	--------------	---	---------------	-------------

Assessment Tasks / Activities (ATs)

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)	
1	Hand-in assignments	1, 2, 3, 4, 5	20	The assignments will include both writing and computational exercises designed to help students develop skills in data analysis and better understand the statistical concepts presented in the lectures.
2	Quiz	1, 2, 3, 4, 5	30	Quiz will evaluate whether students can understand the biostatistical concepts.

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2-3

Additional Information for ATs

Remarks for Examination: The exam will cover materials presented in lectures, labs, readings and assignments.

Assessment Rubrics (AR)**Assessment Task**

1. Hand-in assignments

Criterion

Ability to explain basic concepts of biostatistics and perform statistical computations

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

2. Quiz

Criterion

Ability to apply biostatistics concepts and methods to real data

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

3. Examination

Criterion

Ability to apply statistical concepts and methods to a range of problems in biological and biomedical sciences

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

Distributions, descriptive statistics, confidence intervals, hypothesis testing

Reading List

Compulsory Readings

Title	
1	Pagano M. and Gauvreau K. Principles of Biostatistics. Pacific Grove, CA: Duxbury.

Additional Readings

Title	
1	Thomas W. MacFarland. Introduction to Data analysis and Graphical Presentation in Biostatistics with R: Statistics in the Large.
2	Bernard Rosner. Fundamentals of Biostatistics