

MS5217: STATISTICAL DATA ANALYSIS

Effective Term

Semester A 2025/26

Part I Course Overview

Course Title

Statistical Data Analysis

Subject Code

MS - Decision Analytics and Operations

Course Number

5217

Academic Unit

Decision Analytics and Operations (DAOS)

College/School

College of Business (CB)

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

MS5212 Statistical Methods I

Exclusive Courses

MS5312 Business Statistics

Part II Course Details

Abstract

This course offers a comprehensive introduction of statistical principles and computational tools utilized in data analysis. The main aim is to develop the necessary expertise to carry out descriptive, analytical, and predictive data analysis to tackle

real-world issues. The class will extensively showcase examples of solving statistical problems in finance and economics to provide practical insights. Moreover, the course lays the foundation for quantitative skills that can be utilized in elective courses pertaining to marketing, finance, economics, operations management, and advanced data science disciplines.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Identify the key issues of a business problem; and formulate these issues into statistical models for further analysis.	N.A.	x	x	x
2	Apply the statistical knowledge acquired through the course to select the most appropriate technique for a given problem.	N.A.	x	x	x
3	Analyze relevant data effectively using appropriate statistical techniques to solve the problems and evaluate the results in the context of the problems.	N.A.		x	x
4	Enhance proficiency in utilizing statistical packages for conducting statistical analysis.	N.A.		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 learn the concepts and specific subject knowledge during the lectures	1, 2, 3	2
2	Class discussion	Students will work in groups to discuss real business problems and cases, and to explore possible solutions. The instructor provides instant feedback and support for students' queries.	1, 2, 3	0.5

3	In-class exercise	Students will work together on assigned problem sets to consolidate their understanding of the concepts and methods with the teacher acting as a facilitator. They are required to formulate the problem into a mathematical model (the concept) and proceed to solve the problem (the method). Although these are standard textbook exercises, these exercises have real-life applications.	1, 2, 3, 4	0.5
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Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks ("- " for nil entry)	Allow Use of GenAI?
1	Assignment	1, 2, 3, 4	60	-	Yes

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

3

Minimum Continuous Assessment Passing Requirement (%)

40

Minimum Examination Passing Requirement (%)

40

Assessment Rubrics (AR)**Assessment Task**

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

Criterion

Core concepts, ideas, and use of statistical software

Excellent

(A+, A, A-) Strong evidence of knowing how to apply the relevant techniques and software in performing statistical analysis

Good

(B+, B, B-) Evidence of knowing how to apply the relevant techniques and software in performing statistical analysis

Fair

(C+, C, C-) Some evidence of knowing how to apply the relevant techniques and software in performing statistical analysis

Marginal

(D) Little evidence of familiarity with the subject matter

Failure

(F) No evidence of familiarity with the subject matter

Assessment Task

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

Criterion

Core concepts and ideas; use of appropriate statistical methods

Excellent

(A+, A, A-) Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base

Good

(B+, B, B-) Evidence of grasp of subject, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with literature

Fair

(C+, C, C-) Student who is profiting from the university experience; understanding of the subject; ability to develop solutions to simple problems in the material

Marginal

(D) Little evidence of familiarity with the subject matter; weakness in critical and analytic skills; limited or irrelevant use of literature

Failure

(F) No evidence of familiarity with the subject matter

Assessment Task

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

Criterion

Core concepts, ideas, and use of statistical software

Excellent

(A+, A, A-) Strong evidence of knowing how to apply the relevant techniques and software in performing statistical analysis

Good

(B+, B) Evidence of knowing how to apply the relevant techniques and software in performing statistical analysis

Marginal

(B-, C+, C) Some evidence of knowing how to apply the relevant techniques and software in performing statistical analysis

Failure

(F) Little evidence of familiarity with the subject matter

Assessment Task

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

Criterion

Core concepts and ideas; use of appropriate statistical methods

Excellent

(A+, A, A-) Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base

Good

(B+, B) Evidence of grasp of subject, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with literature

Marginal

(B-, C+, C) Student who is profiting from the university experience; understanding of the subject; ability to develop solutions to simple problems in the material

Failure

(F) Little evidence of familiarity with the subject matter; weakness in critical and analytic skills; limited or irrelevant use of literature

Part III Other Information

Keyword Syllabus

- Basic R programming
- Exploratory data analysis and graphics
- Monte Carlo approximation (law of large numbers)
- Basic probability
- Bayes' Theorem
- Normal model for conjugate prior and posterior inference.
- Probability Distribution (discrete and continuous distributions)
- Sampling distribution (central limit theorem)
- Statistical estimation
- Confidence intervals
- Hypothesis testing
- Basic linear regression
- Data Privacy

Reading List

Compulsory Readings

Title	
1	Statistics for Business: Decision Making and Analysis, by Robert Stine and Dean Foster
2	OpenIntro Statistics, by David Diez, Mine Cetinkaya-Rundel, Christopher Barr, and OpenIntro
3	Naked Statistics, by Charles Wheelan
4	AIQ: How People and Machines Are Smarter Together, by Nick Polson and James Scott

Additional Readings

Title	
1	Nil