MS5318: PREDICTIVE ANALYTICS WITH EXCEL AND R

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Predictive Analytics with Excel and R

Subject Code
MS - Decision Analytics and Operations
Course Number
5318

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
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract

This course introduces key statistical concepts and methodologies essential for making data-driven predictions. Starting with fundamental statistical analysis, such as inference and simple regression, it expands into more advanced topics like logistic regression and model selection. You will learn to build predictive models using datasets with various structures, including quantitative and categorical responses and predictors. Discover the balance between over-predicting and under-predicting, and apply these methods to real-world business problems, such as healthcare operations and fraud detection, through practical examples and case studies. Excel will be used for data manipulation and visualization, while R will be employed for processing data and generating prediction models. No prior statistical knowledge or experience with Excel and R is required, making this course accessible to beginners.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Understand and apply fundamental statistical techniques including hypothesis testing, regressions, model selection and calibration, and data visualization.	40	x		
2	Utilize predictive analytics in business contexts to inform and enhance decision-making.	30	x	x	
3	Formulate and analyze real-world data problems and effectively communicate data-driven solutions	30	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	Engaging in Lectures and In-Class Practice	Students will attend in-class lectures where the instructor introduces key concepts and modeling techniques. Students will understand how to perform statistical modeling using Excel and R. Students will practice the newly acquired knowledge through in-class exercises.	1, 2, 3	3 hours/week

2	Completing Assignment	Students will work on after-class exercises to deepen the understanding of basic concepts and practice modeling techniques. Peer discussions are encouraged on assignment problems. Students must complete the assignments individually to ensure personal understanding and application of the material.	1, 2, 3	
3	Collaborating on Group Project	Students will form a group with other students to tackle a real-world decision-making problem using provided datasets. Students will collaborate with peers to apply statistical knowledge to this project, analyze the data, and develop solutions.	1, 2, 3	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Class Participation	1	10	GenAI is allowed in class	Yes
2	Assignment	1, 2, 3	25	You can refer to GenAI, but finish the assignments by yourself	No
3	Group Project	2, 3	15	-	Yes
4	Test	1, 2	20	GenAI is not allowed during exams	No

Continuous Assessment (%)

70

Examination (%)

30

Examination Duration (Hours)

3

Assessment Rubrics (AR)

Assessment Task

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

Criterion
Level of evidence of attending class on time, participating in-class discussion; no private conversations no use of cell phones/laptops unless with the permission of the instructor

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

Criterion
Level of evidence of critical capacity and analytic ability; understanding of concepts

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

Criterion
Level of understanding of key concepts and abilities to develop predictive models as well as to interpret the solutions

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
In-Class Test (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion
Level of understanding of statistical concepts and predictive modelling methods

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

Criterion
Level of understanding of key concepts and abilities to develop predictive models as well as to interpret the solutions

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

Criterion
Level of evidence of attending class on time, participating in-class discussion; no private conversations no use of cell phones/laptops unless with the permission of the instructor

Excellent
(A+, A, A-) High

Good
(B+, B) Moderate

Marginal
(B-, C+, C) Basic

Failure
(F) Unsatisfactory

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

Criterion
Level of evidence of critical capacity and analytic ability; understanding of concepts

Excellent
(A+, A, A-) High

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(B-, C+, C) Basic

Failure
(F) Unsatisfactory

Part III Other Information

Keyword Syllabus

- Data Visualization;
- Data manipulation with R
- Sampling
- Hypothesis testing and confidence intervals
- ANOVA
- Regressions: simple/multiple linear regression

- Variable selection
- Classification: Logistic regression, KNN

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	An Introduction to Statistical Learning, by Robert Tibshirani and Trevor Hastie
2	Statistics for Business: Decision Making and Analysis, Second Edition, by Robert Stine and Dean Foster.
3	Business Statistics for Competitive Advantage with Excel 2013, Second Edition, by Cynthia Fraser.
4	Practical Regression and Anova using R (this is an online book), By Julian J. Faraway