

MS3252: REGRESSION ANALYSIS

Effective Term

Semester A 2024/25

Part I Course Overview

Course Title

Regression Analysis

Subject Code

MS - Management Sciences

Course Number

3252

Academic Unit

Management Sciences (MS)

College/School

College of Business (CB)

Course Duration

One Semester

Credit Units

3

Level

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

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

CB2200 Business Statistics or equivalent

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course aims to:

- Introduce regression and analysis of variance techniques and models commonly used in solving business problems.
- Provide an opportunity for students to practice quantitative research skills with real business cases related to management decision making.
- Build students' competence in using contemporary computer software such as SAS, IBM' s SPSS, R, Python to analyze business data.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain concepts in regression analysis and analysis of variance.	30	x	x	
2	Evaluate statistical theory and its relevance to different real-world business problems.	30		x	
3	Evaluate critically the appropriateness, accuracy and limitations of various statistical methods.	20		x	
4	Apply contemporary computer software such as SAS, SPSS, R, Python to analyze data arising from real-life business problems, interpret the results and give recommendations.	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	Discuss regression models and techniques. Explain relevant concepts and knowledge. Demonstrate using statistical software to solve real-world business problems.	1, 2, 3, 4

2	Exercises	Students work on exercises that strengthen their analytical skills in statistical modelling within a business context. They are required to perform the analysis using computer software, interpret the model results, and give recommendations.	1, 2, 3, 4	
---	-----------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------	--

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Exercises Exercises are designed to reinforce students' statistical modelling skills. Statistical software may be involved.	1, 2, 3, 4	30	
2	Mid-Term Test Aim to test the students' ability in choosing a suitable statistical technique to analyze a data set with particular features and executing the technique to get the correct answer.	1, 2, 3, 4	30	

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

2

Additional Information for ATs**Examination**

Aim to test the students' ability in choosing a suitable statistical technique to analyze a data set with particular features and executing the technique to get the correct answer.

Assessment Rubrics (AR)**Assessment Task**

Exercises

Criterion

Students are required to work on these exercises individually to practice their analytical skills in statistical modelling within a business context.

Excellent (A+, A, A-)

Strong evidence of the capacity to analyze and synthesize; superior grasp of subject matter.

Good (B+, B, B-)

Evidence of grasp of subject; reasonable understanding of issues.

Fair (C+, C, C-)

Student who has some understanding of the subject; ability to develop solutions to simple problems in the material.

Marginal (D)

Sufficient familiarity with the subject matter to enable the student to progress without repeating the course.

Failure (F)

Little evidence of familiarity with the subject matter; weakness in critical and analytic skills.

Assessment Task

Mid-Term Test

Criterion

The test is designed to assess students' professional knowledge of selecting and applying different statistical models to solve business problems. Computer output may be given for students' interpretation and suggestions.

Excellent (A+, A, A-)

Strong evidence of the capacity to analyze and synthesize; superior grasp of subject matter.

Good (B+, B, B-)

Evidence of grasp of subject; reasonable understanding of issues.

Fair (C+, C, C-)

Student who has some understanding of the subject; ability to develop solutions to simple problems in the material.

Marginal (D)

Sufficient familiarity with the subject matter to enable the student to progress without repeating the course.

Failure (F)

Little evidence of familiarity with the subject matter; weakness in critical and analytic skills.

Assessment Task

Written Examination

Criterion

The exam is designed to assess students' professional knowledge of selecting and applying different statistical models to solve business problems. Computer output may be given for students' interpretation and suggestions.

Excellent (A+, A, A-)

Strong evidence of the capacity to analyze and synthesize; superior grasp of subject matter.

Good (B+, B, B-)

Evidence of grasp of subject; reasonable understanding of issues.

Fair (C+, C, C-)

Student who has some understanding of the subject; ability to develop solutions to simple problems in the material.

Marginal (D)

Sufficient familiarity with the subject matter to enable the student to progress without repeating the course.

Failure (F)

Little evidence of familiarity with the subject matter; weakness in critical and analytic skills.

Part III Other Information

Keyword Syllabus**Multiple Regression**

Review of simple linear regression. Overview of the concept of linear models. Formulation and assumptions of multiple regression models. Inferences about regression parameters. Diagnostics of residuals. Comparing two regression models. Partial F-tests. Model building and variables selection strategies: all possible, forward, backward and stepwise regression. Multicollinearity. Using dummy variables and interacting terms. Transformations in regression analysis. Regression on dummy dependent variables.

Logistic Regression

Binary logit models. Maximum likelihood estimation. Odds ratio. Goodness of fit tests.

Analysis of Variance

One-way analysis of variance. Partition of the total sum of squares: ANOVA table.

Bayesian Linear Regression

Overview of frequentist and Bayesian approaches. Prior and posterior distributions. Formulation of Bayesian linear regression.

Reading List**Compulsory Readings**

	Title
1	Mendenhall, W. and Sincich T. A Second Course in Statistics: Regression Analysis. Prentice Hall.

Additional Readings

	Title
1	Dielman, T.E. Applied Regression Analysis: A Second Course in Business and Economic Statistics, 4/e, Duxbury, 2005.
2	Kutner, M.H., Nachtsheim, C.J. and Neter J. Applied Linear Regression Models, 5/e, McGraw Hill, 2011.
3	Levine, D.M., Szabat K A, Stephan D F, Business Statistics: A First Course, 8/e, Prentice Hall, 2020.
4	Fox J, Weisberg S, An R Companion to Applied Regression. Sage Publication, 2011.
5	Ciaburro G, Regression Analysis with R, Packt Publishing, 2018.
6	Massaron L, Boschetti A, Regression Analysis with Python, Packt Publishing, 2016.
7	SAS Online Documents https://support.sas.com/en/documentation.html
8	Statistics Glossary https://www.statistics.com/glossaries/
9	Multiple Regression with Ren & Stimpy http://www.-psych.nmsu.edu/regression/home.html