EE3211: MODELLING TECHNIQUES

Effective Term
Semester A 2022/23

Part I Course Overview

Course Title
Modelling Techniques

Subject Code
EE - Electrical Engineering
Course Number
3211

Academic Unit
Electrical Engineering (EE)

College/School
College of Engineering (EG)

Course Duration
One Semester

Credit Units
3

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

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
EE3001 Foundations of Data Engineering

Precursors
Nil

Equivalent Courses
EE2203 Modelling Techniques

Exclusive Courses
Nil

Part II Course Details

Abstract

This course aims to develop students' ability to formulate, analyse and solve statistical or engineering problems using software tools, such as R. The goal of the course is to train students to become effective modellers who can build sound models to solve statistical or engineering problems in various functional areas.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the processes for modelling, statistical or engineering problems, and analyzing data		x	x	
2	Formulate the statistical models for the real problems		x	x	
3	Implement the models using software tools		x	x	x
4	Verify the results obtained from software tool models, and communicate the analysis and findings in layman's terms		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.

Teaching and Learning Activities (TLAs)

	TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Explain key concepts in modelling Practice some modelling skills	1, 2, 3, 4	3 hrs/wk

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Tests (min.: 2)	1, 2, 3, 4	45	
2	#Assignments (min.: 3)	1, 2, 3, 4	25	

Continuous Assessment (%)

70

Examination (%)

30

Examination Duration (Hours)
3

Additional Information for ATs
Remark:
To pass the course, students are required to achieve at least 30% in course work and 30% in the examination.

may include homework, tutorial exercise, project/mini-project, presentation

Assessment Rubrics (AR)

Assessment Task
Examination

Criterion
Achievements in CILOs

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
Coursework

Criterion
Achievements in CILOs

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

Introduction to statistical modelling tools
Definition of statistical modelling. Types of statistical models. Introduction of features and functions of the software tools. Examples on the above features and functions.

Data Analysis using software tools
Features of data in engineering contexts using statistics. Data analysis to support decision making. Extracting information from available data. Visualization and data processing using software tools.

Real world problems
Introduction of real world problems in different areas. Modelling of those problems. Applying the software tools to solve those problems.

Analysis of modelling processes
Plots examination.Sample size determination. Interpretation of results.

Various topics in applied multivariate analysis such as multiple linear regression, logistic regression, parametric and non-parametric statistical models and longitudinal analysis.

Reading List

Compulsory Readings

	Title
1	Lecture notes
2	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.