

EE6435: MULTI-DIMENSIONAL DATA MODELING AND ITS APPLICATIONS

Effective Term

Semester A 2025/26

Part I Course Overview

Course Title

Multi-Dimensional Data Modeling and its Applications

Subject Code

EE - Electrical Engineering

Course Number

6435

Academic Unit

Electrical Engineering (EE)

College/School

College of Engineering (EG)

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 aims to provide a fundamental understanding of multiple dimensional modeling and analysis techniques. The focus will be general modeling and methods for managing and analyzing large datasets which are produced by different modern technologies. As we are living in the midst of a data explosion the goal of this course is to equip the students with the ability to convert data into knowledge.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if DEC-A1 DEC-A2 DEC-A3 app.)			
1	Describe the concept of multiple types of data and data modelling techniques.		x		
2	Explain the basic operations that can be performed on a multi-dimensional data model and the analytical functionalities.		x	x	
3	Identify and perform the steps involved in converting data into knowledge.		x	x	x
4	Demonstrate how the multi-dimensional data models are used in decision making and analysis using real applications.		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	Lecture	Students will engage in formal lectures to gain knowledge about the course	1, 2, 3, 4	3 hrs/wk

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks ("- " for nil entry)	Allow Use of GenAI?
1	Tests (min.: 2)	1, 2, 3	30	-	No
2	#Assignments/ Projects (min.: 3)	1, 2, 3, 4	20	-	Yes

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Minimum Continuous Assessment Passing Requirement (%)

30

Minimum Examination Passing Requirement (%)

30

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

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 level

Assessment Task

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

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 level

Assessment Task

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

Criterion

Achievements in CILOs

Excellent

(A+, A, A-) High

Good

(B+, B) Medium

Marginal

(B-, C+, C) Low

Failure

(F) Not even reaching marginal level

Assessment Task

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

Criterion

Achievements in CILOs

Excellent

(A+, A, A-) High

Good

(B+, B) Medium

Marginal

(B-, C+, C) Low

Failure

(F) Not even reaching marginal level

Additional Information for AR

Constructive Alignment with Programme Outcomes

PILO 1,2,3 The course provides students with opportunities in acquiring knowledge of multidimensional data modelling techniques, and also the applications of mathematics

PILO 4, 5 Students are required to complete a min-project designed to gain practical experience in implementing general data analysis techniques. The analytical and research skills developed are central to the aims of this program.

Part III Other Information

Keyword Syllabus

Fundamental of multi-dimensional model

Nature of data; data structures; data analysis.

Basic operations on BIG data sets

Classification, clustering, anomaly detection, association analysis, avoiding false discoveries .

Application of multi-dimensional model

Mini-projects are designed to complement the lecture aspects of the course, and to gain practical experience by applying multi-dimensional analysis tools targeting the information technology industry. The mathematical and engineering skills developed are central to the aims of this course.

Reading List

Compulsory Readings

Title	
1	P. Tan, M. Steinbach, V. Kumar and A. Karpatne Introduction to Data Mining. Second edition, Global edition. New York: Pearson, 2019 [E-book]

Additional Readings

Title	
1	NIL