

**City University of Hong Kong
Course Syllabus**

**offered by Department of Electrical Engineering
with effect from Semester A in 2024/2025**

Part I Course Overview

Course Title:	<u>Multi-Dimensional Data Modeling and its Applications</u>
Course Code:	<u>EE6435</u>
Course Duration:	<u>One Semester (13 weeks)</u>
Credit Units:	<u>3</u>
Level:	<u>P6</u>
Medium of Instruction:	<u>English</u>
Medium of Assessment:	<u>English</u>
Prerequisites: <i>(Course Code and Title)</i>	<u>Nil</u>
Precursors: <i>(Course Code and Title)</i>	<u>Nil</u>
Equivalent Courses: <i>(Course Code and Title)</i>	<u>Nil</u>
Exclusive Courses: <i>(Course Code and Title)</i>	<u>Nil</u>

Part II Course Details

1. 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.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Describe the concept of multiple types of data and data modelling techniques.		✓		
2.	Explain the basic operations that can be performed on a multi-dimensional data model and the analytical functionalities.		✓	✓	
3.	Identify and perform the steps involved in converting data into knowledge.		✓	✓	✓
4.	Demonstrate how the multi-dimensional data models are used in decision making and analysis using real applications.		✓	✓	✓
		100%			

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.

3. Learning and Teaching Activities (LTAs)

(LTAs designed to facilitate students' achievement of the CILOs.)

LTA	Brief Description	CILO No.						Hours/week (if applicable)
		1	2	3	4			
Lecture	Students will engage in formal lectures to gain knowledge about the course	✓	✓	✓	✓			3 hrs/wk

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.						Weighting	Remarks
	1	2	3	4				
Continuous Assessment: <u>50%</u>								
Tests (min.: 2)	✓	✓	✓				30%	
#Assignments/Projects (min.: 3)	✓	✓	✓	✓			20%	
Examination: <u>50%</u> (duration: 2 hrs , if applicable)								
Examination	✓	✓	✓				50%	
							100%	

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

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Examination	Achievements in CILOs	High	Significant	Moderate	Basic	Not even reaching marginal level
2. Coursework	Achievements in CILOs	High	Significant	Moderate	Basic	Not even reaching marginal level

Applicable to students admitted from Semester A 2022/23 to Summer Term 2024

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B,)	Marginal (B-, C+, C)	Failure (F)
1. Examination	Achievements in CILOs	High	Medium	Low	Not even reaching marginal level
2. Coursework	Achievements in CILOs	High	Medium	Low	Not even reaching marginal level

6. Constructive Alignment with Programme Outcomes

PILO	How the course contributes to the specific PILO(s)
1,2,3	The course provides students with opportunities in acquiring knowledge of multi-dimensional data modelling techniques, and also the applications of mathematics and engineering problem solving skills which are central to the aims of this program.
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 (more details can be provided separately in the teaching plan)

1. 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.

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

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

(Additional references for students to learn to expand their knowledge about the subject.)

NIL