Title (Units): **COMP7105 Business Data Analytics (3,3,0)**

Course Aims: This course introduces principal concepts of data analysis and data management. It covers various topics including quantitative methods, data analytics, data mining, data management, and data visualisation. It is expected that students can understand the principles of data analysis and their applications. Students shall also be able to solve real-life business problems using numeracy and data analytics skills.

Prerequisite: Nil

Course Intended Learning Outcomes (CILOs):
Upon successful completion of this course, students should be able to:

No.	Course Intended Learning Outcomes (CILOs)
	Knowledge
1	Describe the fundamentals of database management
2	Explain concepts of data analysis techniques and data mining algorithms
3	Describe the concepts of data visualisation in data analytics
	Professional Skill
4	Apply data analytics methods and software to solve real-life business problems

Calendar Description: This course introduces principal concepts of data analysis and data management and their applications in real-life business problems. Topics mainly include 1) fundamentals of quantitative methods; 2) representation of data in a relational database and formulation of data query; 3) knowledge of data analytics and data mining; 4) data visualisation concepts.

Teaching and Learning Activities (TLAs):

CILOs	Type of TLA
1-3	Students will learn the fundamentals of data analysis, management, and visualisation concepts via lectures and tutorials.
4	Students will gain practical experiences to solve real-life business problems via hands-on activities.

Assessment:

No.	Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
1	Continuous Assessment	40%	1-4	Continuous assignments are designed to measure how well students have learnt the fundamentals of quantitative methods, data analysis, data management, and data visualisation techniques. Assignments and hands-on activities are designed to evaluate how well students can apply data analytics to solve real-life business problems. Quizzes are used to determine to what extent the students have achieved the expected learning outcomes.
2	Examination	60%	1-3	Final examination questions are designed to identify how far students have achieved the intended learning outcomes. Questions will primarily assess students' knowledge in quantitative methods as well as analyzing, managing and visualising data.

Assessment Rubrics:

Excellent (A)	• Achieve the eight CILOs, demonstrating a mastery of fundamentals of data analysis, management and visualisation • Have a thorough understanding of concepts and technologies involved, and be able to explain and highlight the key points of these concepts and technologies • Able to apply data analysis, management, and visualisation techniques in solving real-life business problems
Good (B)	• Achieve the eight CILOs, demonstrating a good understanding of fundamentals of data analysis, management and visualisation • Have a good understanding of concepts and technologies involved, and be able to explain and highlight the key points of these concepts and technologies • Able to apply data analysis, management, and visualisation techniques in solving familiar real-life business problems
Satisfactory (C)	• Achieve most of CILOs, demonstrating a basic level of understanding of fundamentals of data analysis, management and visualisation • Have a basic understanding of the concepts and technologies involved • Able to apply data analysis, management, and visualisation techniques in solving simple real-life business problems
Fail (F)	• Achieve less than three of CILOs, having little understanding of fundamentals of data analysis, management and visualisation • Have little understanding of concepts and technologies involved, and are unable to explain and highlight the key points of these concepts and technologies • Unable to apply data analysis, management, and visualisation techniques in solving simple real-life business problems

Course Content and CILOs Mapping:

Content		**CILO No.**
I	Foundations of Quantitative Method	2,4
II	Data Analytics	2,4
III	Data Management	1
IV	Data Mining	2,4
V	Data Visualisation	3,4
VI	Case Studies on Real-world Business Applications of Data Analytics	4

References:

- Marc Peter Deisenroth, A. Aldo Faisal, Cheng Soon Ong, Mathematics for Machine Learning, Cambridge University Press, 1st Edition, 2020.
- Ramez Elmasri and Shamkant B. Navathe. Fundamentals of Database Systems, 7th edition, Addison Wesley, 2015.
- Anil Maheshwari. Data Analytics Made Accessible, Amazon Digital Services LLC, 2023.
- Jure Leskovec, Anand Rajaraman and Jeffrey David Ullman. Mining of Massive Datasets, 3rd edition, Cambridge University Press, 2020.
- Jiawei Han, Micheline Kamber, Jian Pei. Data Mining: Concepts and Techniques, 4th edition, Morgan Kaufmann, 2022.
- Knaflic, Cole N. Storytelling with Data: a Data Visualization Guide for Business Professionals. Hoboken, New Jersey: Wiley, 2015.
- Stephanie Evergreen. Effective Data Visualization: The Right Chart for the Right Data, SAGE Publications, Inc, 2nd edition, 2020.

Course Content:

Topic

I. Foundations of Quantitative Method
   A. Linear algebra operations on vector, matrix and tensor
   B. Probability models

II. Data Analytics
   A. Types of data analytics: descriptive, diagnostic, predictive, and prescriptive
   B. Statistics concepts
   C. Statistical analysis techniques (such as correlation analysis, linear regression and their applications)
   D. Business applications of data analytics

III. Data Management
   A. Database system concepts
   B. Relational data model
   C. Queries and updates in SQL
   D. Business applications of data management

IV. Data Mining
   A. Data preparation for knowledge discovery
   B. Classification and Clustering algorithms (such as perceptrons, K-NN, K-means, and Hierarchical clustering)
   C. Business applications of data mining

V. Data Visualisation
   A. Concepts of data visualisation
   B. Charts, maps and infographics
   C. Business applications of data visualization

VI. Case Studies on Real-world Business Applications of Data Analytics