Hong Kong Baptist University
Faculty of Science
Department of Mathematics

Title (Units): ORBS7120 Big Data Analytics and Visualisation (2,2,0)

Course Aims: This course aims to introduce students to the power of big data analytics and data visualisation techniques in contributing to industrial development. The module will also enable students to solve a variety of complex data centred business problems using computer software tools like R, Python and Gephi.

Prerequisite: No

Prepared by: Luo Dehui

Remark: This course is delivered by staff of HKBU or University of Kent.

Course Intended Learning Outcomes (CILOs):

Upon successful completion of this course, students should be able to:

No.	Course Intended Learning Outcomes (CILOs)
1	Explain big data analytics and visualisation techniques.
2	Critically evaluate and apply big data techniques using software such as R and Gephi.
3	Develop a systematic understanding in order to build and apply skills in big data network analytics, text mining, and social media data mining.
4	Explain critical awareness of how managers and executives utilise big data analytics for business value creation by improving their operational, social, and financial performance and create opportunities for new industrial development.
5	Explain database management concepts and their connections with big data analytics.

Teaching & Learning Activities (TLAs):

CILO	TLAs will include the following:
1,2,3,4,5	Lectures with rigorous mathematical discussions and concrete examples. Lecturer will constantly ask questions in class to make sure that the majority of students are following the teaching materials.
1,2,3,4,5	Assignments to monitor both students' learning and mastering of the taught materials. In addition, common mistakes will also be addressed and analyzed.

Assessment:

No.	Assessment Methods	Weighting	CILO Addressed	Remarks
1.	Test	20%	all	Test is designed to measure students' understanding of the theory, techniques, and applications of business intelligence and decision support system. Test is conducted to monitor the students' recognizing of the theory, techniques and skills taught in the class. This may involve, but not limited to, in-class discussions of rigorous technical problems and their solutions.
2	Project	80%	all	The course will be assessed 100% by a written report (~2000-4000 words) on the use of simulation modelling applied to a realistic case- study problem. The coursework will assess

				students' comprehension of key topics introduced in the course, as well as require them to demonstrate their model building and analytical skills.

Course Intended Learning Outcomes and Weighting:

Content	CILO No.	Teaching (in hours)
1. Theoretical understanding of big data analytics	1,2,3,4,5	13
2. Building practical skills and managerial insights	1,2,3,4,5	13

References:

1. Lemahieu, W., vanden Broucke, S., Baesens, B. (2018). *Principles of Database Management: The Practical Guide to Storing, Managing and Analyzing Big and Small Data.* Cambridge University Press.
2. Luke, D.A. (2015). *A User's Guide to Network Analysis in R. Springer*.
3. Kolaczyk, E.D., Csardi, G. (2014) *Statistical Analysis of Network Data with R. Springer*.
4. Sanders, R.N. (2014) *Big Data Driven Supply Chain Management: A Framework for Implementing Analytics and Turning Information into Intelligence*. Pearson FT Press.
5. Danneman, N., Heimann R. (2014) *Social Media Mining with R. Packt Publishing.*

Course Content in Outline:

1. Theoretical understanding of big data analytics: This part involves learning about the theoretical foundations of big data analytics, text mining, and social media data mining. It also introduces the effective use of data visualisation and database management concepts and their links with big data analytics. Example applications of big data analytics and visualisation techniques discussed within the module will focus on addressing contemporary challenges faced by industry.
2. Building practical skills and managerial insights: In this part of the module, students will learn how to solve business problems using advanced functions within the R and Gephi software platforms. Students will be guided through demonstrations involving a variety of exercises that will prepare them to be data-driven managers and executives capable of utilising big data analytics for business value creation.

(Approved by the Science Faculty Board Meeting by circulation in August 2024)
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(Approved by the Department Management Committee on 5 September 2023)