

**City University of Hong Kong
Course Syllabus**

**offered by Department of Information Systems
with effect from Semester A 2021 / 2022**

Part I Course Overview

Course Title: Big Data Management

Course Code: IS2021

Course Duration: One Semester

Credit Units: 3

Level: B2-4

Arts and Humanities

Proposed Area:
(for GE courses only)

Study of Societies, Social and Business Organisations

Science and Technology

Medium of Instruction: English

Medium of Assessment: English

Prerequisites:
(Course Code and Title) Nil

Precursors:
(Course Code and Title) Nil

Equivalent Courses:
(Course Code and Title) CB2021 Big Data Management

Exclusive Courses:
(Course Code and Title) Nil

Part II Course Details

1. Abstract

Big data is one of the most important disruptive information technologies that transforms the business and society today. Local and global business firms start to realize the importance of big data, they invest heavily in these areas to drive substantial enhancements in their business models, partnerships and business processes. This trend creates great demand for our graduates and business professionals with knowledge and skills in big data management for business innovations.

This course aims to:

- Provide students with a solid understanding of the principles, methods and technologies for big data management to drive business innovations;
- Equip students with the essential knowledge and skills to model the requirements, design a plan for big data management and evaluate the effectiveness of the proposed solution;
- Enable students to apply the learnt methods and technologies in big data management for business improvements and innovations.

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.	Understand the principles, methods and technologies of big data management for business improvements and innovations.	30%	✓	✓	
2.	Design strategic plans for using big data management to solve business problems, and evaluate the effectiveness of the proposed solutions.	35%		✓	✓
3.	Develop solutions using conceptual modelling methods and technologies in big data for business improvements and innovations.	35%		✓	✓
		100%			

* If weighting is assigned to CILOs, they should add up to 100%.

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

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 self-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. Teaching and Learning Activities (TLAs)

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

TLA	Brief Description	CILO No.			Hours/week (if applicable)
		1	2	3	
TLA1: Lecture	<p>Concepts, knowledge and skills of big data analytics and cloud services are explained in the lectures.</p> <ul style="list-style-type: none"> <i>In-class discussion</i>: Students participate in discussions in lectures (e.g. face-to-face discussion, using course management platforms) and the lecturer provides feedback based on students' responses. <i>Recap</i>: In the beginning of every lecture, the lecturer will summarize the topics covered in the previous lecture and provide feedback based on students' concerns and questions. 	✓	✓	✓	Seminar: 3 hours/week
TLA2: Tutorials and Case Studies	<p>The tutorial covers the concepts, methods and theories of various aspects of big data management.</p> <ul style="list-style-type: none"> <i>Tutorial exercises</i>: e.g. hands-on activities on big data management related to big data privacy, big data quality and business process integrations, etc. <i>Case studies</i>: Students will be given a case or project in areas of location-based services or profile-based recommendation services using big data. There will be many discussions on various aspects of the case or project for improving the brands or achieving the business success. 	✓	✓	✓	
TLA3: Outside classroom activities	<p>Additional help provided outside official class time.</p> <ul style="list-style-type: none"> <i>Online Helpdesk</i>: An online course management system is available to provide extra help to students having difficulties with the course outside the classroom. Students can raise questions about the concepts, methods and cases and tutors will answer students' questions online. 	✓	✓	✓	

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		
Continuous Assessment: 40%					
<p><u>AT1: Participation</u> 10% of the marks will be given to student's attendance and participation, as measured by the quality of questions, answers and student engagement in both lectures and tutorials throughout the semester.</p>	✓	✓	✓	10%	
<p><u>AT2: Group Project</u> There will be a group project associated with the course. The grading of the project will be based on academic quality together with the measurable usage data and peer ranking in the class. The topic of the project should be related to application of big data management for business improvements and innovations. The project members will utilize discovery-driven strategies, and develop a new business proposal. The project requires a project proposal and a presentation.</p>	✓	✓	✓	30%	
Examination: 60% (duration: one 2-hour exam)					
<p><u>AT3: Final Exam</u> The final exam will be closed book. Students will be assessed via the examination on their understanding of concepts learned in class, textbooks and reading materials, and their ability to apply subject-related knowledge.</p>	✓	✓	✓	60%	
				100%	

* The weightings should add up to 100%.

[#] Remark: Students must pass BOTH coursework and examination in order to get an overall pass in this course.

5. Assessment Rubrics

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

Assessment Task (AT)	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
AT1: Participation	Ability to demonstrate an understanding of the principles, methods and technologies of big data management for business improvements and innovations.	High	Significant	Moderate	Basic	Not even reaching marginal levels
	Ability to design strategic plans for using big data management to solve business problems, and evaluate the effectiveness of the proposed solutions.	High	Significant	Moderate	Basic	Not even reaching marginal levels
	Capability to develop solutions using conceptual modelling methods and technologies in big data for business improvements and innovations.	High	Significant	Moderate	Basic	Not even reaching marginal levels
AT2: Group Project	Ability to demonstrate an understanding of the principles, methods and technologies of big data management for business improvements and innovations.	High	Significant	Moderate	Basic	Not even reaching marginal levels
	Ability to design strategic plans for using big data management to solve business problems, and evaluate the effectiveness of the proposed solutions.	High	Significant	Moderate	Basic	Not even reaching marginal levels
	Capability to develop solutions using conceptual modelling methods and technologies in big data for business improvements and innovations.	High	Significant	Moderate	Basic	Not even reaching marginal levels
AT3: Final Exam	Ability to demonstrate an understanding of the principles, methods and technologies of big data management for business improvements and innovations.	High	Significant	Moderate	Basic	Not even reaching marginal levels
	Ability to design strategic plans for using big data management to solve business problems, and evaluate the effectiveness of the proposed solutions.	High	Significant	Moderate	Basic	Not even reaching marginal levels
	Capability to develop solutions using conceptual modelling methods and technologies in big data for business improvements and innovations.	High	Significant	Moderate	Basic	Not even reaching marginal levels

Part III Other Information

1. Keyword Syllabus

(An indication of the key topics of the course.)

- Introduction
 - Concepts and principles of big data (e.g. volume, velocity, variety and veracity), market and business drivers, industry barriers and considerations for big data management in a business context.
- The business cases
 - Characteristics of big data applications, perception and quantification of business values, assessing organizational fitness, and design of business cases for big data applications.
- Organizational alignment
 - Conceptual modelling to identify big data requirements and connect business goals and technologies
 - Culture clash challenges, criteria for adopting big data technology, the role of organizational alignment.
 - Types of big data applications, product knowledge hub, infrastructure and operations studies, location-based services, profile-based recommendation services.
- Organizational strategy
 - The strategic plan for technology adoption, criteria to decide what, how and when big data technologies are right for you, good practices for soliciting business user requirements.
- Big data governance
 - Big data governance, the difference with big datasets, big data oversights, policy and processes for big data analytics.
 - Big data maturity models, big data privacy, and big data quality.
- High-performance appliance for big data management
 - Storage considerations, big data appliances (hardware and software tuned for big data applications), architectural choices, performance characteristics, platform alternatives.
- Big data tools and techniques
 - Overview of high-performance architectures, HDFS, MapReduce and YARN, Zookeeper, HBase, Hive and Mahout.
- Big data applications
 - Managing the lifecycle of big data, machine-to-machine data, big transaction data, biometrics, human-generated data.
 - Industry perspectives and case studies in governments, healthcare, utilities and communication service providers.

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.	David Loshin, 2013, <u>Big Data Analytics: From strategic planning to enterprise integration with tools, techniques, NoSQL and graph</u> , Elsevier, ISBN: 978-0-12-417319-4.
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2.2 Additional Readings

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

1.	Sunil Soares, 2012, <u>Big Data Governance: An emerging imperative</u> , MC Press Online, ISBN: 978-1-58347-377-1.
2.	Arvind Sathi, 2012, <u>Big Data Analytics: Disruptive Technologies for Changing the Game</u> , MC Press Online, ISBN: 978-1-58347-380-1.