Subject Description Form

Subject Code	DSAI1101
Subject Title	Fundamentals of AI and Data Analytics
Credit Value	2
Level	1
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	This subject introduces the basic concepts and techniques of data analytics and artificial intelligence based on knowledge in statistics and computational tools. It also illustrates the application of data analytics and artificial intelligence in various industries in real life. This course underscores how data analysis and artificial intelligence are pivotal to maintaining and advancing Hong Kong's status as an international financial, innovation and technology centre.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) demonstrate an understanding of the fundamental concepts of AI and Data Analytics (AIDA); (b) acquire basic skills in using AIDA technologies and applications; (c) articulate examples of how the adoption of AIDA could enhance their chosen disciplines; (d) demonstrate an awareness of global contemporary ethical issues and the impact of AIDA applications in daily life; (e) apply statistical reasoning to describe and analyze different types of data sets; (f) understand the mathematics and statistics knowledge behind data analytics and artificial intelligence; (g) implement an AIDA approach for studying and reporting statistical data. (h) analyse case studies to illustrate how AIDA are applied in various industries, with focus on finance, innovation, and technology relevant to Hong Kong.

Subject Synopsis/ Indicative Syllabus	General introduction to data science
	Data collection, data types, data structures, selected case studies relevant to Hong Kong.
	Data preparation and exploration
	Data cleaning/processing, data summary, frequency table, density plot, data visualization, computational tools of statistics and data analytics (e.g., R/Python)
	Foundation statistics
	Descriptive statistics, measures of central tendency and dispersion, measures of association, linear regression
	Artificial intelligence
	Concept of machine learning, artificial neural network, algorithms for classification via Python API such as scikit-learn
	Application
	Application of artificial intelligence and data analytics in specific topics such as finance analytics, regression analysis, prediction, healthcare, smart city development, etc.

Teaching/Learning Methodology	The subject will be mainly delivered through lectures/ tutorials/ labs/ seminars. The lectures and tutorials will be conducted to introduce the basic data analytics concepts of the topics in the syllabus which are then reinforced by learning activities involving demonstration and tutorial exercises. Labs will be conducted to introduce practical techniques in computer programming. Seminars will be given by guest speakers on specific topics. An e-module "Foundation Statistics" will be adopted as a self-learning aid for studying fundamental statistics knowledge.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						
		(a)	(b)	(c)	(d)	(e)	(f)	(g)
1. Assignments / tests / quizzes	30%	✓	✓			✓	✓	✓

2. Term paper/ mini-project	30%	✓	✓	✓	✓	✓		✓
3. Examination	40%	✓	✓			✓	✓	✓
Total	100%							

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Continuous Assessment comprises of two parts.

(1) Assignments / tests / quizzes

This will allow the instructor(s) to observe and assess individual student's achievement of a particular learning outcome based on the coverage of the assigned problem set questions. Some of the assignment or test questions might require students to self-learn with online teaching materials as part of the e-learning module.

(2) Term paper / mini-project

Students are required to submit an individual term paper / mini-project. This should include a proposal addressing problems in their chosen discipline (finance, social science, marketing, etc), literature review of related papers, data analysis, and the application of AIDA knowledge as a solution to the problem.

Examination

A written final examination is held at the end of the semester to assess students' overall understanding of AIDA knowledge.

Student Study Effort Expected	Class contact:	
	▪ Lectures/ Tutorials/ Labs/ Seminars	26 Hrs.
	Other student study effort:	
	▪ Self-study, e-learning	54 Hrs.
	Total student study effort	80 Hrs.

Reading List and Reference	Raschka, S. and Mirjalili, V. (2019). Python Machine Learning: Machine Learning and Deep Learning with Python, Scikit-Learn, and TensorFlow (3rd Edition). Packt Publishing. Adhikari, A. and DeNero, J. (2019). Computational and Inferential Thinking: The Foundations of Data Science. GitBook. Davy, C., Meysman, A. D. B., and Ali, M. (2016). Introducing Data Science: Big Data, Machine Learning, and More, Using Python Tools. Manning Publications. Utts, J.M. (2014). Seeing Through Statistics (4th edition). Cengage Learning. Utts, J. M. and Heckard, R. F. (2015). Mind on Statistics (5th edition). Cengage Learning. Wickham, H. and Grolemund, G., *R for Data Science*, O'Reilly Media, 2017.