

### **Subject Description Form**

<b>Subject Code</b>	COMP1004
<b>Subject Title</b>	Introduction to Artificial Intelligence and Data Analytics
<b>Credit Value</b>	2
<b>Level</b>	1
<b>Pre-requisite/ Co-requisite/ Exclusion</b>	Nil
<b>Objectives</b>	<p>The objectives of this subject are to:</p> <ol style="list-style-type: none"> <li>1. introduce to students the concept and principles of Artificial Intelligence and Data Analytics (AIDA);</li> <li>2. introduce students to examples of how AIDA can be applied in their own discipline;</li> <li>3. prepare students for subsequent selection of minor and secondary major in AIDA through strengthening their understanding of using AIDA to solve practical problems; and</li> <li>4. raise students' awareness of ethical and societal issues stemming from AIDA in daily life.</li> </ol>
<b>Intended Learning Outcomes</b>	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> <li>a. demonstrate an understanding of the foundational concepts of Artificial Intelligence and Data Analytics (AIDA);</li> <li>b. acquire basic skills in using AIDA technologies and applications;</li> <li>c. articulate examples of how the adoption of AIDA could enhance their chosen disciplines; and</li> <li>d. demonstrate an awareness of global and local contemporary issues of ethics and impact from AIDA applications in daily life.</li> </ol>
<b>Subject Synopsis/ Indicative Syllabus</b>	<ol style="list-style-type: none"> <li><b>1. Data analytics basics</b> <ul style="list-style-type: none"> <li>• Definition of Big Data, 4V's of Big Data</li> <li>• Types of data, data analytics capabilities, data analytics process and visualisation</li> </ul> </li> <li><b>2. Machine Learning and Artificial Intelligence Applications</b> <ul style="list-style-type: none"> <li>• Overview of artificial intelligence, machine learning and deep learning;</li> <li>• Supervised vs unsupervised learning; Performance measures, e.g., accuracy, false positive, false negative, recall, precision;</li> <li>• AIDA applications: Chatbots, recommender systems, customer relationship and click stream analysis, social network and sentiment analysis, recommender system, text translation and</li> </ul> </li> </ol>

	<p>summarisation, robotics, intelligent transportation system, auto-driving, face recognition, medical image analysis and diagnosis, biometrics, etc</p> <p><b>3. Generative AI and its applications</b></p> <ul style="list-style-type: none"> <li>• Definition and types of Generative AI, Large Language Models (e.g. GPT, Gemini, Claude), Prompt Design and Prompt Engineering, Image generation, Video generation;</li> <li>• Applications of Generative AI, limitations of Generative AI technologies (e.g. hallucination)</li> </ul> <p><b>4. Societal implications of AIDA</b></p> <ul style="list-style-type: none"> <li>• Concerns of data privacy; AI ethics;</li> <li>• Global and societal impacts of AIDA applications;</li> <li>• Applying AIDA to align Hong Kong's development with the "Eight Centres" - International Financial Centre, International Innovation and Technology Centre, East-meets-West Centre for International Cultural Exchange, International Trade Centre, International Shipping Centre, International Aviation Hub, Centre for International Legal and Dispute Resolution Services in the Asia-Pacific region as well as Regional Intellectual Property Trading Centre.</li> </ul>
<b>Teaching/Learning Methodology</b>	<p><b>1. Exercises/e-Learning Module</b></p> <p>Students should complete exercises and hands-on activities using a range of AI, data analytics, and generative AI tools.</p> <p>The e-learning module is developed and delivered by the Department of Computing at PolyU, consisting of readings, exercises and assessments that are designed to introduce students to the basic concept and practice of AIDA.</p> <p><b>2. Lectures and Seminars</b></p> <p>AIDA concepts and fundamental skills will be given through lectures. In-class activities (e.g., discussions and exercises) will be used to better engage students in active learning.</p>
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	<p>Students' performance in this subject will be assessed using a letter-grading system in accordance with the University's convention from grade F (failure) to A+. The relative weighting of the different assessment components is as follows:</p>

	Specific assessment methods/ tasks	% weighting	Intended subject learning outcomes to be assessed			
			a	b	c	d
	Exercises, e-Learning module and assignments	20%	✓	✓		✓
	Quizzes	50%	✓	✓		✓
	Group Project	30%	✓	✓	✓	✓
	Total	100%				
<p><i>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</i></p> <p>Hands-on exercises will enable students to understand the basic foundation of AIDA concepts (IOL a) and practice and apply data analytics techniques (ILO b). The e-learning module contains assessment questions and lab tasks involving basic foundation concepts about AIDA (ILO a) and covering also some basic understanding about the technology and applications (ILO b).</p> <p>Quizzes are given to help students better understand the points discussed in lectures (ILO a), learn how to employ the knowledge to solve AIDA problems (ILO b) and their potential global and societal context impacts (ILO d).</p> <p>Students should work on a group project that requires them to study a specific problem within their chosen discipline (e.g., business, public health, and social science) (ILO c) and/or to carry out data analytics tasks and develop AI-related solutions (ILO a,b).</p>						
<b>Student Study Effort Expected</b>	<b>Class Contact</b>					
	<ul style="list-style-type: none"> <li>Lecture / Seminars</li> </ul>					23 hours
	<b>Other student study effort:</b>					
	<ul style="list-style-type: none"> <li>Self-study</li> <li>e-Learning Module</li> </ul>					25 hours
	<ul style="list-style-type: none"> <li>Literary review and essay writing / Project development and report writing</li> </ul>					22 hours
	Total student study effort					70 hours

<b>Reading list and references</b>	<ol style="list-style-type: none"> <li>1. Peter Bruce and Andrew Bruce, <i>Practical Statistics for Data Scientists: 50 Essential Concepts</i>, O'Reilly Media, 2017.</li> <li>2. McFedries, P., <i>Excel data analysis for dummies</i>, John Wiley &amp; Sons, 4th Edition, 2019.</li> <li>3. Bissett, B., <i>Automated data analysis using Excel</i>, 2nd Edition, CRC Press, 2021.</li> <li>4. Zhou, H., <i>Learn Data Mining Through Excel A Step-by-Step Approach for Understanding Machine Learning Methods</i>, Apress, 2020.</li> <li>5. Hastiem, T., Tibshirani, R., and Friedman, J., <i>The Elements of Statistical Learning: Data Mining, Inference, and Prediction</i>, 2nd Edition, Springer, 2009.</li> <li>6. Russell, S. and Norvig, P., <i>Artificial Intelligence: A Modern Approach</i>, 4th Edition, Pearson, 2021.</li> <li>7. Bishop, Christopher M., <i>Pattern Recognition and Machine Learning</i>. Springer, 2016.</li> </ol>
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