Subject Description Form

Subject Code	DSAI5202
Subject Title	Emerging Topics in Artificial Intelligence and Big Data Computing
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	The objectives of this subject are to: 1. provide the students with new advances in artificial intelligence and big data computing in emerging areas. 2. discuss the contemporary techniques in artificial intelligence. 3. teach students to apply skills and tools to manage and analyse big data in different disciplines.
Intended Learning Outcomes *(Note 1)*	Upon completion of the subject, students will be able to: a) understand the advanced concepts and challenges of artificial intelligence and big data models in emerging areas. b) apply artificial intelligence techniques to various cutting-edge applications in emerging areas. c) collect, manage, store, query, and analyse various forms of big data analytics. d) design artificial intelligence solutions to solve new challenges in the real world by considering different requirements. e) participate in teamwork, presentation and technical writing.
Subject Synopsis/ Indicative Syllabus	1. *Artificial Intelligence (AI), Its Roots and Scope.* Overview of AI application areas; Machine Learning; Computer vision; Natural language processing; Big graph analytics; Health informatics. 2. *Introduction to Collection of Big Data.* The 3 V's, their challenges and application domains; Data visualisation: Data types and dimensions; Visual encoding and perception

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<td>Subject Synopsis/ Indicative Syllabus (Cont'd)</td>
<td>
3. The Social and Economic Impact of Artificial Intelligence.
AI and the Law; Algorithmic bias; Computational ethics.

4. Machine-brain interfaces.
Brain Computer Interface; EEG basics; Signal Processing in BCIs; ERP Processing

5. Artificial Intelligence for Security.
AI-based user authentication technologies; Early detection, identification and prediction of cyber security threats

6. Artificial Intelligence for Fintech.
Finance Technology Stack; AI & Machine Learning in Finance

7. Artificial Intelligence for Biomedicine and Healthcare.
Medical imaging; Knowledge-Based and Decision Support Systems; Probabilistic Modeling and Reasoning; Gene and Protein Data

8. Artificial Intelligence of Things (AI and IoT).
Autonomous Systems; Sensor Networks; Control Systems; Energy Systems; Smart Grids
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<td>Teaching/Learning Methodology</td>
<td>39 hours of class activities, including lectures, tutorials, labs, etc., where applicable.</td>
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<td>Assessment Methods in Alignment with Intended Learning Outcomes</td>
<td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="5">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td></tr>
<tr><td>1. Assignments, Tests, and Project</td><td>55</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>2. Exam</td><td>45</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="5"></td></tr>
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Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Continuous assessments consist of assignments, tests and a project, which are designed to facilitate students to achieve the intended learning outcomes. The project is designed to enhance students' ability to acquire the understanding and use different knowledge, principles, techniques, and tools to solve a real problem through a team. Assignments and tests are to ensure the students understand the concepts.

The examination will evaluate students' understanding and usage of AI and big data technologies.
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Student Study Effort Expected	Class contact:	
	▪ Class activities (lecture, tutorial)	39 Hrs.
	Other student study effort:	
	▪ Assignments, project, tests, exam, self-study	66 Hrs.
	Total student study effort	105 Hrs.
Reading List and References	1. Russell Stuart, and Peter Norvig. Artificial Intelligence: A Modern Approach (4th Edition). Pearson 2020, ISBN 9780134610993 2. Kaplan Jerry. Artificial Intelligence: What Everyone Needs to Know. Oxford University Press, 2016. 3. Dean Jared. Big data, data mining, and machine learning: value creation for business leaders and practitioners. John Wiley & Sons, 2014. 4. Arslanian, Henri, and Fabrice Fischer. The future of finance: The impact of FinTech, AI, and crypto on financial services. Springer, 2019. 5. Panesar, Arjun. Machine learning and AI for healthcare. Coventry, UK: Apress, 2019. 6. Yampolskiy, Roman V., ed. Artificial intelligence safety and security. CRC Press, 2018. 7. Murphy, Robin R. Introduction to AI robotics. MIT press, 2019. 8. Mazzone, Marian, and Ahmed Elgammal. "Art, creativity, and the potential of artificial intelligence." Arts. Vol. 8. No. 1. Multidisciplinary Digital Publishing Institute, 2019. 9. Al-Turjman, Fadi, ed. Artificial intelligence in IoT. Springer, 2019	