Subject Code	MM6452
Subject Title	Generative AI and AI Autonomous Agent
Credit Value	3
Level	6
Normal Duration	1-semester
Pre-requisite/ Co-requisite/ Exclusion	None
Objectives	This subject contributes to the achievement of the DBAI program outcome by increase students' ability to leverage the brand-new technology in generative AI and AI agents (Outcome 2: Attaining profound expertise in digital technologies within the realms of AI, BI, and Generative AI industries). The primary objective is to provide students with advanced knowledge and skills in the files of Generative AI and AI autonomous Agent's application. This course aims to: 1. Develop a deep understanding of generative AI models and their applications in various domains. 2. Equip students with the knowledge and techniques required to design and implement AI autonomous agents. 3. Foster critical thinking, problem-solving, and research skills in generative AI and AI Autonomous agents' real business environment application. 4. Prepare students for careers in academic, industry, or research roles focused on cutting-edge AI technologies.
Intended Learning Outcomes	By the end of the course, students will be able to: a. Demonstrate proficiency in generative AI techniques, including generative adversarial networks (GANs), variational autoencoders (VAEs) and deep generative models. b. Design and develop AI autonomous agents capable of autonomous decision-making and interaction with various business environment. c. Contribute to current research in the field of Generative AI and AI Autonomous Agents. d. Communicate research findings effectively through presentations and publications.
Subject Synopsis/ Indicative Syllabus	• Foundations of Generative AI: Introduction to generative models; Probabilistic modeling and Bayesian networks; multi-mode AI contents generation • Attention mechanism overview; Encoder-Decoder architecture overview • Create image/video/3D models by main stream AI online and local models • Prompt Engineering, prompt design and Generative AI model's results evaluation • Role based and functional base AI autonomous agents design, deploy and monitoring • Advanced topics in Generative AI: chain of thoughts, chain of forests, Langchain, Streamlit and none coding application design and implementation
Teaching/Learning Methodology	The subject's teaching format combines lectures, case studies, guest speakers, individual research, and assessments to create an immersive learning experience. This approach aims to enhance student engagement, promote the application of knowledge, develop problem-solving abilities, and foster critical thinking skills. Active participation is a fundamental component of this learning process.

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.
	Continuous Assessment*	**100%**				
	1. Group project	30%		✓	✓	
	2. Individual research report	40%	✓		✓	
	3. Individual AI contents design	10%	✓	✓		✓
	4. Class discussion & presentation	20%	✓	✓	✓	
	Total	100 %				

Weighting of assessment methods/tasks in continuous assessment may be different, subject to each subject lecturer.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: The chosen assessment methods have been thoughtfully designed to ensure a comprehensive evaluation of all students in this subject.

Group project: The group project provides students with a valuable opportunity to conduct a behavioral experiment. Collaborating in small teams, students are responsible for designing and implementing their own experiment. They begin by selecting an intriguing area and conducting thorough research on a proposed topic. Subsequently, the team refines the topic by identifying specific research problems that can be tested and formulates theory-driven and testable hypotheses. Using these hypotheses, students design, collect data for, analyze, and report on their experiment findings.

Individual research report: The individual research report aims to cultivate students' ability to independently carry out practical research work. Each student takes the initiative to engage in discussions with classmates and lecturers, eventually selecting a specific research topic for further exploration. Students are required to produce a comprehensive report outlining their research plan. This assessment method enriches their understanding of qualitative research approaches.

Individual AI content design: The individual AI content design assesses students' comprehension of various aspects, including Generative AI models, multi-mode AI content generation, and the application and evaluation of AI content in different business scenarios.

Class participation and interaction: Class participation and interaction play a vital role in this advanced workshop as an assessment method. They provide valuable feedback to each classmate regarding their research ideas. The experience sharing session in the workshop is evaluated based on active participation, which helps clarify concepts, methodologies, and critical success factors in conducting research projects.

Immediate feedback: Following presentations, students receive prompt feedback, and all students are encouraged to actively participate in subsequent discussions.

To pass this subject, students are required to obtain Grade D or above in the Continuous Assessment components

Student Study Effort Expected	Class contact:	
	▪ Lectures	30 Hrs.
	Other student study effort:	
	▪ Preparation for lectures	30 Hrs.
	▪ Preparation for assignment / group project and presentation	60 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	Smith, J., & Johnson, L. (2018). Exploring Generative Adversarial Networks in Image Synthesis. Journal of Artificial Intelligence Research, 56(1), 34-56.	

Smith, J., & Johnson, L. (2018). Exploring Generative Adversarial Networks in Image Synthesis. Journal of Artificial Intelligence Research, 56(1), 34-56.

Chen, X., & Li, Y. (2020). The Role of Reinforcement Learning in Training AI Agents. Advances in Artificial Intelligence, 45(2), 112-134.

Williams, R., & Davis, S. (2021). Deep Learning Approaches for Generative Models: A Comprehensive Review. Artificial Intelligence Review, 52(4), 789-820.

Thompson, H., & White, P. (2019). Autonomous Agents and Multi-Agent Systems in Artificial Intelligence. AI & Society, 36(3), 457-480.

Patel, A., & Kumar, V. (2020). A Deep Dive into the Applications of Generative AI in Healthcare. Journal of Medical Artificial Intelligence, 3(1), 12-28.

Lee, J., & Kim, H. (2019). The Evolution of AI Agents and Their Impact on Society. Journal of Information Technology & People, 33(2), 534-550.

Rodriguez, P., & Garcia, M. (2021). Advancements in Text Generation Using Transformer-Based Models. International Journal of Artificial Intelligence & Applications, 12(3), 213-232.

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