MASTERS OF COMPUTING IN APPLIED ARTIFICIAL INTELLIGENCE (MCAAI)

PROGRAMME OVERIEW

This programme bridges the gap between AI theory and real-world application, enabling professionals from diverse domains to integrate AI responsibly into their workflows and enhance organisational efficiency. Through a rigorous curriculum, participants will gain:

Core foundational knowledge in AI, ensuring a deep understanding of key concepts and methodologies.

Insights into emerging AI technologies, keeping them at the forefront of innovation.

Hands-on experience in AI implementation, empowering them to apply AI effectively and ethically within their respective industries.

Tailored for working professionals with a Bachelor's degree in any discipline, the MCAAI programme fosters a future-ready workforce that can navigate and harness AI advancements to accelerate AI-driven transformation across enterprises and public sector organisations in Singapore.

Course Code	Course Title
CA6000	Applied AI Programming
CA6001	AI Algorithms Fundamental & Application
CA6002	AI UX & Data Visualisation Design Principles
CA6003	Best Practices in Data Governance, Preparation and Analytics
CA6111	AI Ethics & Governance Fundamentals
CA6113	Responsible Generative AI & Applications
CA6114	Addressing Issues in Generative AI System Design & Deployment
CA6115	AI in Banking & Finance
CA6118	AI in Law
CA6121	AI in Project Management
CA6122	Company-sponsored Capstone Project
CA6123	Agentic AI & Applications
CA6131	Embedded AI & Applications

Note: Not all courses listed in the curriculum will be offered in a semester. Courses offered are subject to availability of instructors and resources.

COURSE CONTENT

CA6000	Applied AI Programming
Applied AI Programming is primary designed to equip you with the foundation of using Python programming language to develop artificial Intelligence applications. This course will first teach you about the basic concepts of python programs development, follows by how it can be used with various packages and AI frameworks that are commonly used to develop AI applications. Through this course, you will develop practical skills through hands-on exercises with Numpy, Pandas, Seaborn, Matplotlib, Scikit-Learn, TensorFlow and PyTorch to develop simple predictive AI and generative AI applications, which you will then use in other courses in the MCAAI programme.	

CA6001	AI Algorithms Fundamental & Application
AI Algorithms Fundamentals & Application is designed to equip students with a solid understanding of core artificial intelligence algorithms and their applications in real-world scenarios. Whether you're a working professional or an aspiring AI practitioner looking to build a strong foundation, this course will guide you through essential techniques such as search, optimization, decision-making, and machine learning. Students will develop practical skills through hands-on projects that reflect challenges in industries like finance and technology.	

CA6002	AI UX & Data Visualisation Design Principles
This course discusses the principles and value of human-centred AI (HCAI) and its impact on how professionals using AI in various industries consider and identify tasks within work processes for effective AI augmentation or automation. It covers issues related to the design of HCAI user experience designs that imbue trust during user interaction and improve usability, thereby promoting more widespread adoption of AI solutions.	

CA6003	Best Practices in Data Governance, Preparation & Analytics
This course aims to equip learners with a comprehensive understanding of the foundational best practices in managing data throughout the AI development lifecycle. It focuses on three critical pillars: data governance, data preparation, and data analytics- recognizing that data is the foundation of everything in AI. Learners will explore key governance principles including data privacy, ethical use, security, and compliance with regulations. The course then delves into practical techniques for preparing data for machine learning, covering processes such as data validation, cleaning, transformation, and enrichment. Finally, it addresses best practices in exploratory data analysis (EDA), highlighting how to identify and mitigate issues such as missing data, outliers, data bias, and statistical fallacies like Simpson's paradox.	

CA6111	AI Ethics & Governance Fundamentals

This course introduces AI Ethics and Governance (AIE&G) issues relevant to the many industries that exploit AI solutions. These issues include internal governance structures, level of human involvement in AI decision making, operations management, stakeholder interaction and communication, etc It gives an overview of the Singapore Computer Society's comprehensive AIE&G Body of Knowledge 1.0 (BoK) document and proposes an AI Governance Framework for organisations that is built on the understanding of well-established guidelines for Responsible AI, best practices in adapting an organisation and the use of tools that can help manage and mitigate AI-related risks. At the end of this course, learners will be able to put into practice appropriate AI governance considerations and processes in designing and deploying AI solutions.

CA6113	Responsible Generative AI & Applications

With the rapid growth in Generative Artificial Intelligence (GAI) technologies, professionals in every industry need a good grasp of what GAI is and how they can exploit it in a responsible and thoughtful manner. This introductory course helps learners understand GAI technology, its capabilities, limitations and applications in various scenarios. More importantly, it highlights new ethical risks associated with the use of GAI, along with risk mitigation strategies and practical approaches in deploying trusted GAI solutions. Exercises in effective prompt engineering techniques will expose learners to the use of GAI tools to generate relevant text and images that are context-appropriate for their needs and that of their organisations.

CA6114	Addressing Issues in Generative AI System Design and Deployment

Employing Generative AI (GAI) solutions responsibly in an enterprise requires addressing many issues at all stages of the endeavour, from design, development, and deployment to post-deployment.

This course introduces practical considerations at each of these stages, from deciding to use a GAI solution, to formulating an appropriate GAI system design, and to implementing appropriate GAI governance. This course also covers the security and safety testing issues relevant to GAI systems and their unique vulnerabilities, suggesting practical mitigation strategies for a resilient and responsible GAI deployment.

CA6115	AI in Banking & Finance

This course aims to introduce key AI techniques that are used in the financial sector. These include key financial functionalities in compliance (AML/KYC), algorithmic trading, financial fraud detection, investment management and risk management.

The learning will help learners apply the AI concepts already taught in the core modules including data visualisation principles, and AI algorithm fundamentals.

Key concepts such as supervised, unsupervised learning, deep learning and reinforcement learning shall be covered with some of its applications in finance.

The course also explores latest developments in Agentic AI and LLMs and how they can be used for financial applications.

CA6118	AI in Law

This course aims to introduce students to the emerging legal, ethical, and governance issues associated with the use and deployment of AI systems, including in the law, the legal practice and in the administration of justice. This course provides core legal and policy background for legal work in the AI adoption environment by focusing on the relevant legal and ethical regimes. The course is grounded in the law, but encompasses interdisciplinary perspectives pertinent to the legal, regulatory, ethical and technological issues. The course also introduces students to some core AI tools in the legal field and demonstrate the limitations and risks of the tools, cementing the need for AI deployment to begin from a solid understanding of the AI technology.

CA6121	AI in Project Management

This course aims to introduce concepts in project management with coverage of evolving trends and application of artificial intelligence. The learning helps to apply the Artificial Intelligence (AI) concepts in executing projects which includes design, procurement, and execution phases. This equips the participants to enhance their skill set, improve employability, and career growth. Key concepts such as project integration, scope management, project planning, project budget & cost management, project procurement, project implementation, project risks, conflicts, communication, and stake-holder management shall be covered.

CA6122	Company-Sponsored Capstone Project

This is a Pass/Fail course.

This course aims to bridge the gap between academic learning and real-world industry challenges and provides opportunities for beneficial AI solutions to be developed and deployed in organizations in Singapore. The objectives of such a project are to train students to apply AI solutions in solving real-world industry problems and to Improve technical skills, teamwork and problem-solving with AI solutions in a real-world setting.

CA6123	Agentic AI and Applications
Agentic AI systems autonomously make decisions, act, and adapt in dynamic environments. As these AI systems integrate into high-stakes fields like healthcare, financial trading and autonomous transactions, understanding their risks and ethical challenges is critical. This course covers the architecture and key components for building agentic AI frameworks, including hands-on training to use an industry standard for providing context to Large Language Models and agents using Model Context Protocol. It guides learners towards responsible agentic AI design and deployment by grounding the practical expertise acquired with knowledge about the unique risks exposed by agentic AI systems and possible mitigation strategies.	

CA6131	Embedded AI & Applications
Embedded AI & Application is designed to equip you with the practical knowledges to deploy artificial intelligence to edge devices such as limited resource microcontroller. This course will discuss and consider the various constraints and challenges in deploying ML to edge devices. Students will then be taught on how to implement TinyML (Tiny Machine Learning) applications on microcontroller using the TensorFlow Lite framework.	