

ARTIFICIAL INTELLIGENCE

Degree Requirements

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Policies and GCAC-700 Professional Degree Policies (<https://gradschool.psu.edu/graduate-education-policies/>).

Master of Artificial Intelligence (M.A.I.)

The Master of Artificial Intelligence degree is conferred upon students who earn a minimum of 30 credits at the 400, 500, or 800 level while maintaining an average grade-point average of 3.0 or better in all course work, including at least 18 credits at the 500 level or 800 level.

The program curriculum consists of 9 credits of **common core courses**, 9 credits of **prescribed courses** within either a selected specialization option or the Base Program, and 9 credits of **elective courses** chosen from an approved list of courses maintained by the program office.

In addition, all program paths culminate in **A-I 894 capstone** (A-I 894) a **3-credit culminating course** that allows students to integrate and apply the theories, methods, processes, and tools of artificial intelligence acquired throughout their studies in a comprehensive, hands-on project experience;;

- The choice of capstone project and exact form will be mutually determined by the instructor and each student.
- Students will collaborate in teams to develop real-world AI products and services, fostering practical experience in project management, teamwork, and the application of AI solutions to industry challenges.
- A written paper based on the applied project is required and must contain project description, analysis, and interpretation of its findings.
- Students will be encouraged to upload their capstone work products to be available publicly via ScholarSphere and to participate in the World Campus Graduate Capstone Exhibition.

Collectively, the M.A.I. prepares graduates to confidently enter the workforce with the expertise needed to design, develop, and deploy ethical and responsible AI technologies across various sectors.

Base Program

Code	Title	Credits
Required Courses		
Core Courses		
A-I 500	Quantitative Methods	3
or STAT 500	Applied Statistics	
A-I 801	Foundation of Artificial Intelligence	3
A-I 804	Ethics of Artificial Intelligence (Required Courses)	3
Prescribed Courses		
DAAN 822	Data Collection and Cleaning	3
DAAN 545	Data Mining	3
A-I 840	Responsible AI	3
Electives		
Select 9 credits of electives from a list of approved courses maintained by the program office.		9
A-I 894	Capstone Experience	3
Total Credits		30

The **Base Program** within the **Master of Artificial Intelligence (M.A.I.)** degree offers a flexible and comprehensive pathway for students who wish to complete the program without declaring a formal specialization. This generalist track provides a broad foundation across the full spectrum of artificial intelligence—from data collection and preparation to modeling, interpretation, and responsible deployment—equipping graduates with the versatility to apply AI principles across multiple industries and professional roles.

Designed for individuals seeking a balanced mix of technical depth and practical application, the Base Program emphasizes the integration of data analytics, AI methodologies, and ethical decision-making.

Through the prescribed courses such as **DAAN 822 – Data Collection and Cleaning**, **DAAN 545 – Data Mining**, and **A-I 840 – Responsible AI**, students gain hands-on experience in data acquisition, preprocessing, and preparation for modeling while developing the ability to apply statistical reasoning and data-driven insights to solve complex problems. Students also learn to identify, clean, and integrate diverse datasets, perform data mining and predictive analytics, and apply machine learning techniques to uncover meaningful patterns and trends.

The prescribed courses in the Base Program utilize no-code tools for assignments and learning activities. In addition, code snippets are provided as supplementary materials to support the development of basic programming skills for students who wish to enhance their programming proficiency.

The curriculum is intentionally broad and interdisciplinary, allowing students to select from a range of approved electives to tailor their studies according to professional interests—whether in computer vision, generative AI, data visualization, or advanced analytics. Learning experiences emphasize both conceptual understanding and applied skills through case-based and project-based assignments that mirror real-world AI challenges.

The Base Program culminates in the **A-I 894 Capstone**, a 3-credit integrative project that allows students to synthesize and apply the theories, methods, and tools of AI to a practical problem. Working individually or in teams, students design, develop, and evaluate a complete AI solution.

The Base Program is particularly suited for students who aspire to roles such as **Data or AI Analyst**, **Applied Machine Learning Generalist**, **Product or Data Strategist**, **Analytics Lead**, or **Responsible AI Coordinator**, as well as for professionals exploring AI applications across diverse domains before pursuing a more specialized focus.

Overall, the Base Program provides a **broad yet rigorous education in artificial intelligence**, preparing graduates to navigate the rapidly evolving AI landscape with the technical fluency and ethical awareness needed to succeed in a variety of professional contexts.

AI Engineering Option

Code	Title	Credits
Required Courses		
Core Courses		
A-I 500	Quantitative Methods	3
or STAT 500	Applied Statistics	
A-I 801	Foundation of Artificial Intelligence	3
A-I 804	Ethics of Artificial Intelligence	3
AI Engineering Option Courses		
A-I 570	Deep Learning	3

A-I 574	Natural Language Processing	3
IE 575	Foundations of Predictive Analytics	3
Electives		
Select 9 credits of electives from a list of approved courses maintained by the program office.		9
Culminating Experience		
A-I 894	Capstone Experience	3
Total Credits		30

The **AI Engineering Option** within the **Master of Artificial Intelligence (M.A.I.)** program is a **systems-oriented pathway** designed for students with prior programming experience who aspire to build, deploy, and optimize AI systems at scale. This option emphasizes **technical rigor, mathematical foundations, and software engineering principles**, preparing students to create advanced AI architectures and integrate them into real-world applications.

Students in this option develop a deep understanding of the theoretical and applied aspects of artificial intelligence, with a focus on designing, implementing, and maintaining AI-driven systems and infrastructure. Coursework in **Deep Learning (A-I 570)** and **Natural Language Processing (A-I 574)** equips students with advanced knowledge of neural networks, representation learning, and model architectures such as convolutional and transformer-based networks, enabling them to create complex AI models for image, text, and multimodal data. In **Predictive Analytics (A-I 575)** and related applied courses, students learn data-driven modeling, statistical learning, and performance optimization, providing them with the analytical framework needed to transform raw data into actionable insights.

Beyond algorithmic understanding, the AI Engineering option emphasizes production-grade engineering skills essential for developing and deploying AI systems in modern environments. They learn to manage and preprocess large datasets efficiently, design scalable AI systems, and implement robust data pipelines that support real-time or batch AI workloads.

The option culminates in the **A-I 894 Capstone**, a comprehensive, project-based experience that challenges students to design, implement, evaluate, and deploy a fully functional AI system. Through this culminating experience, students demonstrate their ability to integrate theory, coding proficiency, data management, and deployment skills in addressing real-world challenges.

Graduates of the AI Engineering Option are equipped to pursue high-level technical and leadership roles such as Machine Learning Engineer, AI Scientist, Computer Vision Engineer, AI Platform Engineer, Software Engineer (ML), Technical Architect, or Chief Engineer. They emerge as professionals capable of advancing the field of AI through innovation, systems thinking, and responsible design—building the technologies that power the next generation of intelligent systems.

Applied and Generative AI Option

Code	Title	Credits
Required Courses		
<i>Core Courses</i>		
A-I 500	Quantitative Methods	3
or STAT 500	Applied Statistics	
A-I 801	Foundation of Artificial Intelligence	3
A-I 804	Ethics of Artificial Intelligence	3

<i>Applied and Generative AI Option Courses</i>		
A-I 810	Artificial Intelligence in Practice	3
A-I 820	Generative Artificial Intelligence	3
A-I 830	Applied Machine Learning	3
Electives		
Select 9 credits of electives from a list of approved courses maintained by the program office.		9
Culminating Experience		
A-I 894	Capstone Experience	3
Total Credits		30

The **Applied and Generative AI Option** within the **Master of Artificial Intelligence (M.A.I.)** program is designed for professionals who wish to harness the power of AI to drive innovation, improve decision-making, and enhance operational efficiency across diverse industries. This pathway focuses on developing the ability to implement and manage AI solutions using intuitive low-code/no-code platforms and generative AI tools, empowering students to become strategic leaders and translators between technical AI systems and organizational objectives.

This option emphasizes technical rigor, mathematical foundations, and strategic perspective on artificial intelligence. Rather than emphasizing coding and system development, it prepares students to conceptualize, evaluate, and deploy AI solutions that align with business needs, social challenges, and digital transformation goals. Students gain a solid theoretical foundation in AI concepts and data literacy, while learning how to apply these principles using modern tools that simplify AI implementation.

Through courses such as **Artificial Intelligence in Practice (A-I 810)**, **Generative Artificial Intelligence (A-I 820)**, and **Applied Machine Learning (A-I 830)**, students gain hands-on experience with the latest low-code/no-code and generative AI platforms. They explore technologies such as **no coding tools**, and **generative AI suites** to design and deploy AI-enabled applications, content, and workflows.

The program culminates in the **A-I 894 Capstone**, a 3-credit integrative project where students collaborate to design, prototype, and present AI-driven products or solutions using the low-code/no-code and generative tools mastered throughout the program. This experience allows them to demonstrate comprehensive understanding, creativity, and strategic application of AI technologies to real-world challenges.

Graduates of the Applied and Generative AI Option are equipped to lead AI adoption initiatives, manage cross-functional innovation projects, and drive digital transformation within their organizations. Typical career outcomes include roles such as AI Application Analyst, AI Product Lead or Manager, Innovation Consultant, Digital Transformation Manager, and Operations Analytics Lead.

Master of Science (M.S.)

The M.S. in Artificial Intelligence degree is conferred upon students who earn a minimum of 30-credits at the 400, 500, or 800 level while maintaining an average grade-point average of 3.0 or better in all course work, including at least 18 credits at the 500 level or 600 level. The program curriculum includes 21 credits of required courses, 3-credits of electives and a 6-credit thesis research.

Code	Title	Credits
Required Courses		
A-I 500 or STAT 500	Quantitative Methods Applied Statistics	3
A-I 801	Foundation of Artificial Intelligence	3
A-I 570	Deep Learning	3
A-I 572	Reinforcement Learning	3
A-I 574	Natural Language Processing	3
IE 575	Foundations of Predictive Analytics	3
A-I 501	Interdisciplinary Research Design for Artificial Intelligence	3
Electives		
Select 3 credits of electives from a list of approved courses maintained by the program office.		3
Culminating Experience		
A-I 600	Thesis Research	6
Total Credits		30

The M.S. in Artificial Intelligence provides a rigorous academic foundation in both the theory and practice of AI. The program begins with core courses in foundational AI, **quantitative analysis**, and **predictive analytics**, followed by advanced topics such as **deep learning**, **reinforcement learning**, and **natural language processing**. Students also receive formal training in research design to prepare for their thesis work. Elective courses such as **Data Mining** and **Machine Vision** allow students to specialize in areas aligned with their research interests and professional goals.

All students will complete their program of study with the 6-credit **research thesis** (A-I 600), through which they contribute novel ideas, applications, or insights to the field under the mentorship of faculty. The research thesis project provides students with an opportunity to apply their knowledge of the theories, methods, processes, and tools of AI, learned throughout their program, in a culminating and summative experience. The choice of project topic and exact form will be mutually determined by the instructor and each student. A written paper based on the applied project is required and must contain project description, analysis, and interpretation of its findings. Students will be encouraged to upload their thesis reports to be available publicly via ScholarSphere and to participate in research poster competitions.

This degree positions students for research roles in academia, government, and industry, or for continuation to doctoral programs in AI and related disciplines

Master of Business Administration (M.B.A.)

The Master of Business Administration in AI (MBAi) degree is conferred upon students who earn a minimum of 33-credits at the 400, 500, or 800 level while maintaining an average grade-point average of 3.0 or better in all course work, including at least 18-credits at the 500 level or 800 level (with at least 6 credits at the 500 level). The program curriculum includes 18-credits of required courses, 9-credits of electives, and a 3-credit capstone course.

Code	Title	Credits
Required Courses		
A-I 500 or STAT 500	Quantitative Methods Applied Statistics	3
A-I 810	Artificial Intelligence in Practice	3

A-I 804	Ethics of Artificial Intelligence	3
BA 800	Marketing Management	3
MGMT 501	Behavioral Science in Business	3
ACCTG 800	Financial and Managerial Accounting	3
MBADM 820	Financial Management	3

Electives

Select 9 credits of electives from a list of approved courses maintained by the program office, which may include, but is not limited to, the following options

MGMT 873	Corporate Innovation Strategies
BUSAD 822	New Venture Start-up
A-I 570	Deep Learning
A-I 572	Reinforcement Learning
A-I 574	Natural Language Processing
A-I 879	Machine Vision
A-I 820	Generative Artificial Intelligence
A-I 830	Applied Machine Learning
A-I 840	Responsible AI
BA 810	Supply Chain and Operations Management

Culminating Experience

A-I 894	Capstone Experience	3
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Total Credits 33

The MBAi degree bridges the gap between technical and managerial domains, enabling students to apply artificial intelligence in solving complex business challenges. Core courses such as **Artificial Intelligence in Practice** and **Ethics of Artificial Intelligence** introduce students to the operationalization and governance of AI in enterprise settings. Foundational business courses in **marketing**, **finance**, **management**, and **accounting** ensure students gain fluency in strategic decision-making and organizational leadership. The elective options allow students to customize their learning path, exploring topics such as **deep learning**, **natural language processing**, **generative AI**, or **venture start-up**, **corporate innovation strategies** and **operations management**. these electives are carefully selected to reflect the most relevant tools and technologies shaping business in the AI era.

All students will complete their program of study with a capstone project (A-I 894), where interdisciplinary teams collaborate to design, implement, and present a comprehensive AI solution tailored to a real-world organizational challenge. This experience allows students to synthesize their learning, apply AI methodologies in business contexts, and demonstrate their capabilities to potential employers or stakeholders. Graduates of the MBAi will be prepared to lead AI-enabled business transformation, oversee technical portfolios and AI strategy, translate business objectives into data-driven, AI-powered solutions and operate at the intersection of innovation, ethics, and leadership in the AI economy.