



Degree Program

Master of Science in Artificial Intelligence

Revised Curriculum (For Fall 2025 and Onwards)

Department of Creative Technologies

Faculty of Computing and Artificial Intelligence (FCAI),

Air University, Islamabad

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Introduction:

The Master of Science in Artificial Intelligence MS(AI) program at the Department of Creative Technologies, Air University Islamabad, prepares students to master advanced AI methodologies, tools, and technologies. The curriculum covers key areas such as machine learning, deep learning, natural language processing (NLP), large language models (LLMs), and signal, image, and video processing. Emerging AI trends like explainable AI, generative AI, and AI for autonomous systems are also integrated to ensure relevance in a rapidly evolving field.

Aligned with global and local market needs, the program aims to develop highly skilled researchers and professionals for careers in government, industry, healthcare, security, business, and applied sciences. It promotes interdisciplinary research, enabling students to apply AI solutions across diverse domains. Graduates of the MS-AI program are equipped to become AI experts in both academia and industry, contributing to Pakistan's AI-driven innovation and technological growth.

Eligibility Criteria:

To be eligible for admission to the MS(SE) program, an applicant must meet the following criteria:

- Bachelor's (or Master's) degree in the subject of Sciences (Computer Science / Artificial Intelligence / Data Science / Information Technology / Bioinformatics / Mathematics / Statistics), Engineering (Computer / Software / Electrical / Electronics / Telecom / Mechatronics / Biomedical) or Equivalent (with strong analytical and programming skills), earned from an HEC-recognized university / institution after completing 16 years of education with CGPA of at least 2.00 (on the scale of 4.00), or First Division in the annual examination system.
- GRE (General) with a minimum score of 151 in Quantitative Reasoning, 145 in Verbal Reasoning, and 3.5/6 in Analytical Writing, OR GAT (General) with at least a 50% score. In case of non-availability of GRE/GAT (General) due to any reason, the concerned department may arrange an equivalent test under the auspices of Air University, and the applicant must score at least 60% in the test to become eligible for admission.

Program Structure:

The two-year MS Artificial Intelligence (MS AI) program combines rigorous coursework with a research component. Students are required to complete five core courses (in addition to a mandatory Research Methodology course), four elective courses. This structure is designed to strengthen foundational knowledge while also enhancing advanced skills and domain-specific competencies in artificial intelligence. The distribution of total credit hours for the MS(AI) program is as follows:

Category/Area	No. of Courses	Credit Hours (Cr. Hrs.)
Core Courses	05	13
Elective Courses	04	12
Non-Credit Course	01	-
MS Thesis	-	06
Fehm-e-Quran	02	02
Total Credit Hours		33

Award of Degree Requirements:

To qualify for the award of the MS(AI) degree, a student must fulfill the following requirements:

- Successfully complete at least 33 credit hours, including all core and required courses
- Achieve a Cumulative Grade Point Average (CGPA) of 2.50 or higher on a 4.00 scale

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Semester-Wise Study Plan for MS-AI (Revised, Fall 2025):

The semester-wise breakdown of total credit hours for the MS(AI) program is as follows:

Sr. No.	Code	Course Title	Cr. Hr.
Semester – I			
1	AI600	Mathematics for Artificial Intelligence (Core – I)	03 (3 – 0 – 3)
2	AI631	Machine Learning (Core – II)	03 (3 – 0 – 3)
3	CS710	Research Methodology (Core – III)	01 (1 – 0 – 1)
4	AIXXX	Elective – I	03 (3 – 0 – 3)
5	FQ100	Fehm-e-Quran I	01 (0 – 1 – 1)
6	* CS501	Applied Programming (* Non-Credit)	*01 (0 – 1 – 1)
Semester Credit Hours			11 (10 – 1 – 11)
Semester – II			
1	AI733	Advanced Artificial Intelligence (Core – IV)	03 (3 – 0 – 3)
2	AI730	Advanced Analysis of Algorithms (Core – V)	03 (3 – 0 – 3)
3	AIXXX	Elective – II	03 (3 – 0 – 3)
4	FQ101	Fehm-e-Quran II	01 (0 – 1 – 1)
Semester Credit Hours			10 (9 – 1 – 10)
Semester – III			
1	AIXXX	Elective – III	03 (3 – 0 – 3)
2	AIXXX	Elective – IV	03 (3 – 0 – 3)
3	AI799	MS Thesis	06 (6 – 0 – 6)
Semester Credit Hours			12 (12 – 0 – 12)
Semester – IV			
1	AI799	MS Thesis (Continued...)	-
Semester Credit Hours			-
Total Credit Hours			33

*** Policy for Undertaking "Applied Programming" Course:** The Applied Programming course is a non-credit lab course (01 Cr. Hr.) and does not contribute to the CGPA. It is designed for MS Artificial Intelligence students who demonstrate deficiencies in programming skills.

- After enrollment, all students will be required to take a Programming Skills Assessment Test (PSAT) administered by the department.
- Students must score at least 50% on the PSAT to demonstrate proficiency.
- Those who fail to meet the required score will be mandated to enroll in and pass the Applied Programming course in the first semester.
- The course will be graded on a Satisfactory/Unsatisfactory basis.

List of Core Courses:

Below is a list of the four (05) core courses for the MS-AI program.

Sr. No.	Code	Course Title	Cr. Hr.
1	AI600	Mathematics for Artificial Intelligence	03
2	AI631	Machine Learning	03
3	AI733	Advanced Artificial Intelligence	03
4	AI730	Advanced Analysis of Algorithms	03
5	CS710	Research Methodology	01
Total Credit Hours			13

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List of Elective Courses:

The list of elective courses offered by the department for the MS(AI) degree program is given below.

Sr. No.	Code	Course Title	Cr. Hr.
Group 01: Core AI Techniques and Reasoning			
1	AI601	Evolutionary Computing	03
2	AI602	Image Processing	03
3	AI605	Probabilistic Programming for AI Systems	03
4	AI610	Parallel Algorithms	03
5	AI611	Automated Reasoning	03
6	AI612	Fuzzy Logic and Fuzzy Reasoning	03
7	AI613	Computational Intelligence	03
8	AI620	Information Theory	03
9	AI621	Estimation Theory	03
10	AI704	Knowledge Engineering	03
11	AI706	Statistical Relational Artificial Intelligence	03
12	AI724	Design of Intelligent Information Systems	03
Group 02: Machine Learning & Deep Learning			
13	AI624	Machine Learning Operations MLOps	03
14	AI625	Generative AI and Foundation Models	03
15	AI626	Multimodal Generative AI Applications	03
16	AI627	AI on Edge Devices and TinyML	03
17	AI632	Advanced Neural Networks	03
18	AI713	Pattern Classification and Recognition	03
19	AI721	Explainable Artificial Intelligence	03
20	AI722	Large Language Models	03
21	AI723	Advanced Generative AI	03
22	AI729	Ethical ML and Fairness in AI	03
23	AI734	Deep Learning	03
24	AI736	Deep Reinforcement Learning	03
Group 03: Data Science and Analytics with AI			
25	AI622	Information Retrieval Techniques	03
26	AI623	Text Mining and Analytics	03
27	AI633	Big Data Analytics	03
28	AI634	Operations Research	03
29	AI635	Multimodal Data Fusion and Analytics	03
30	AI707	Artificial Intelligence for Data Analysis and Visualization	03
31	AI725	Web Mining	03
32	AI726	Social Network Analysis	03
33	AI731	AI for Scientific Discovery and Research Automation	03
34	AI732	Human-in-the-Loop AI Systems	03
35	AI733	AI-Augmented Business Intelligence	03
Group 04: Domain-Specific Applications of AI			
36	AI702	Medical Image Processing and Analysis	03
37	AI703	Computer Vision: From Theory to Applications	03
38	AI708	Intelligent Video Analytics	03
39	AI709	Brain-Computer Interface	03
40	AI715	Artificial Intelligence In Automation	03

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41	AI728	Artificial Intelligence In Information Security	03
42	AI737	Bioinformatics	03
43	AI738	Artificial Intelligence In Sports Analytics	03
44	AI741	Advanced Topics In Medial AI	03
45	AI742	AI for Drug Discovery and Precision Medicine	03
46	AI743	AI in Creative Industries: Art, Music, and Writing	03
47	AI744	AI in Legal, Policy, and Ethical Decision Systems	03
48	AI745	AI for Space and Planetary Exploration	03
49	AI746	Human-AI Collaboration in Healthcare	03
Group 05: Intelligent and Distributed Systems			
50	AI716	Internet of Things and Sensor Networks	03
51	AI717	Ubiquitous Computing and Intelligent Systems	03
52	AI718	Remote Sensing	03
53	AI719	Multi-Agent Systems	03
54	AI727	Logistics and Supply Chain Intelligence	03
55	AI751	AI for Smart Cities and Urban Computing	03
56	AI752	Swarm Intelligence and Collective AI Systems	03
57	AI753	AI for Robotics and Embodied Intelligence	03
58	AI754	AI in Cyber-Physical Systems and Digital Twins	03
59	AI755	Federated and Privacy-Preserving Machine Learning	03
Group 06: Knowledge Representation & Graph-based AI			
60	AI705	Knowledge Graphs for Explainable Artificial Intelligence	03
61	AI735	Natural Language Processing	03
62	AI739	Computational Linguistics	
63	AI761	Graph Representation Learning and GNNs	03
64	AI762	Semantic Web and Ontology Engineering	03
65	AI763	Neuro-Symbolic Graph Reasoning	03
66	AI764	Commonsense Knowledge and Reasoning	03
67	AI765	Knowledge Graph Construction from Unstructured Data	03

**** Important Note:**

- MS Artificial Intelligence students may enroll in elective courses offered within the department, subject to the recommendation of their Academic Supervisor, Chair of the Department, or the Guidance and Evaluation Committee (GEC).
- Only courses classified at the graduate level (MS or equivalent) will be credited toward the program's coursework requirements.
- Students may enroll in maximum of two (2) elective courses within FCAI after approval of Chair of the Department and Dean FCAI.

Applicability of Revised Curriculum:

The updated curriculum is applicable to the Fall 2025 and onward sessions.

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