



Degree Program

Master of Science in Artificial Intelligence
Revised Curriculum (For Spring 2023 and Onwards)

**Department of Creative Technologies,
Faculty of Computing and Artificial Intelligence (FCAI),
Air University, Islamabad**

For Spring 2023 and Onwards

Introduction:

The Master of Science in Artificial Intelligence (AI) degree program, offered at the Department of Creative Technologies, Air University, Islamabad, aims to make students the expert in the subjects, tools and techniques, methods, and models used in the AI domain, leveraging the areas such machine learning, deep learning, mathematics, and signal/image/video processing. This degree program is aligned with the latest trends and demands of the local and international markets, and the department aims to produce highly-skilled researchers in the field to meet our country's current and future demands for AI employment in government, industries, businesses, applied sciences, research, health, and security. This degree program also provides leverage to the students for conducting research in the interdisciplinary domains of AI applications across different departments in the university. Air University expects its MS(AI) graduates to pursue careers as AI experts in either academia or industry.

Eligibility Criteria:

A prospective applicant to the MS(DS) program is required to meet the following minimum eligibility criteria:

- a) Bachelor's (or Master's) degree in the subject of Computer Science/Artificial Intelligence/Data Science/Information Technology/Mathematics/Statistics/Bioinformatics/Biomedical Science/Aviation Sciences/Aviation Management, or Engineering (Computer/Software/Electronics/Telecom/Mechatronics/Biomedical/Avionics/Aerospace/ Naval Architecture), earned from the HEC recognized university/institute, after completing 16 years of education with a CGPA of at least 2.00 (on the scale of 4.00), or first division in the annual system.
- b) GRE (General) with a minimum score of 151 in Quantitative Reasoning, 145 in Verbal Reasoning, and 3.5 out of 6 in Analytical Writing), or GAT (General) with at least 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(AI) degree program comprises both coursework as well as a research component. There are four core courses (in addition to the "Research Methodology" course) and four electives, aimed at strengthening the understanding, skills, and competence of students in fundamental and advanced domains of AI. The distribution of total credit hours for the MS(AI) degree program is given below.

Category/Area	No. of Courses	Credit Hours (Cr. Hrs.)
Core Courses	05	13
Elective Courses	04	12
Non-Credit (NC) Course	01	-
MS Thesis	-	06
Total Credit Hours		31

For Spring 2023 and Onwards

Award of Degree Requirements:

For the award of MS(AI) degree, a student must have:

- Passed courses totaling at least 31 credit hours, including the core courses
- Obtained a CGPA of 2.5 or more on a scale of 4.00

Semester-Wise Study Plan for MS-AI (Revised, Spring 2023):

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

S. #.	Course Title	Cr. Hrs.
Semester-I		
1	Mathematics for Artificial Intelligence (Core-I)	03
2	Machine Learning (Core-II)	03
3	Research Methodology (Core-III)	01
4	Advanced Artificial Intelligence (Core-IV)	03
*5	*Applied Programming (* Non-Credit)	* 01 (0-1-1)
Semester Cr. Hrs.		10
Semester-II		
1	Advanced Analysis of Algorithms (Core-V)	03
2	Elective-I	03
3	Elective-II	03
Semester Cr. Hrs.		09
Semester-III		
1	Elective-III	03
2	Elective-IV	03
3	MS Thesis	06
Semester Cr. Hrs.		12
Semester-IV		
1	MS Thesis (Continue...)	-
Semester Cr. Hrs.		-
Total Cr. Hrs.		31
* The "Applied Programming" course is of no credit and will be offered only to the students having deficiencies in the programming skills.		

*** Policy for Undertaking "Applied Programming" Course:** The Applied Programming course is of no credit and shall not be counted towards the CGPA of students. The course consists of 01 Cr. Hr. of lab and will be undertaken by MS students having deficiencies in their programming skills. The course will be graded as Pass/Fail only. In this respect, the department will conduct a Programming Skills Assessment Test (PSAT) for the students after their enrollment in the MS(AI) program. The students must pass this test with a score of at least 50% to showcase their programming skills. The students who fail to score 50% marks in the test will have to undertake and pass the Applied Programming course in the first semester.

For Spring 2023 and Onwards

List of Core Courses:

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

S. #.	Course Title	Credit Hours
1	Mathematics for Artificial Intelligence	03
2	Machine Learning	03
3	Advanced Analysis of Algorithms	03
4	Advanced Artificial Intelligence	03
5	Research Methodology	01
Total Credit Hours		13

List of Elective Courses:

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

Sr. No.	Course Title	Cr. Hrs.
1.	Evolutionary Computing	3
2.	Image Processing	3
3.	Parallel Algorithms	3
4.	Automated Reasoning	3
5.	Fuzzy Logic and Fuzzy Reasoning	3
6.	Computational Intelligence	3
7.	Information Theory	3
8.	Estimation Theory	3
9.	Information Retrieval Techniques	3
10.	Text Mining and Analytics	3
11.	Advanced Neural Networks	3
12.	Medical Image Processing and Analysis	3
13.	Computer Vision: From Theory to Applications	3
14.	Knowledge Engineering	3
15.	Knowledge Graphs for Explainable Artificial Intelligence	3
16.	Statistical Relational Artificial Intelligence	3
17.	Artificial Intelligence for Data Analysis and Visualization	3
18.	Intelligent Video Analytics	3
19.	Brain-Computer Interface	3
20.	Pattern Classification and Recognition	3
21.	Artificial Intelligence in Automation	3
22.	Internet of Things and Sensor Networks	3
23.	Ubiquitous Computing and Intelligent Systems	3
24.	Remote Sensing	3
25.	Multi-Agent Systems	3
26.	Design of Intelligent Information Systems	3
27.	Web Mining	3
28.	Social Network Analysis	3
29.	Logistics and Supply Chain Intelligence	3
30.	Artificial Intelligence in Information Security	3

For Spring 2023 and Onwards

31.	Deep Learning	3
32.	Natural Language Processing	3
33.	Deep Reinforcement Learning	3
34.	Bioinformatics	3
35.	Artificial Intelligence in Sports Analytics	3

**** Important Note:** For elective courses, an MS(AI) student may study any course within the department as recommended by the academic supervisor/chairman/Guidance and Evaluation Committee (GEC). However, only graduate-level courses or equivalent will be counted towards the coursework requirements of an MS(AI) student. In addition, a student may choose to study the elective courses from the selective list of courses offered at other departments, as given below:

List of Elective Courses from Other Departments:

Sr. No.	Course Title	Cr. Hrs.
1.	Computational Linguistics	3
2.	Digital Signal Processing	3
3.	Soft Computing Systems	3
4.	Embedded System Design	3
5.	Principles of Real-Time Computing	3
6.	General Linguistics	3
7.	Cognitive Linguistics	3
8.	Advanced Cognitive Linguistics	3
9.	Advanced Pragmatics	3
10.	Digital Marketing	3
11.	MEMS Sensors and Actuators	3
12.	Descriptive Analytics and Data Visualization	3
13.	Advanced Statistical Techniques	3
14.	Optimization Techniques	3
15.	Marketing Data Mining	3
16.	Virtual Reality	3
17.	Geographical Information Systems	3
18.	Sensor and Sensing Technology	3
19.	Bio Mechanics	3
20.	Algorithms and Embedded Systems for Mobile Robotics	3
21.	Real Time Robotics System	3
22.	Stochastic Processes	3
23.	Cybersecurity for AI & AI for Cybersecurity	3
24.	Computer Forensics	3

Applicability of Revised Curriculum:

The updated curriculum is applicable to the Spring 2023 and onward sessions.