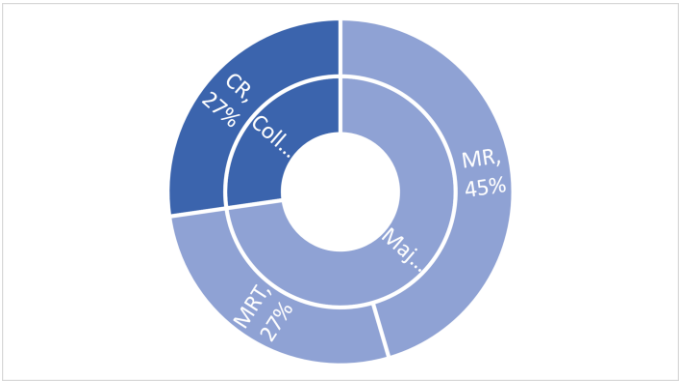
Master of Science in Artificial Intelligence Systems -2025

Program Components

Specializations:

Course Type	CRD
University Requirement (UR)	**--**
College Requirement (CR)	**--**
Major Requirement (MR)	**24**
Major Elective (ME)	**--**
Major Support Requirement (MSR)	**--**
Minor Requirements (Minor)	**---**
Master Thesis	**12**
Total Credits (CRD)	**36**



Detailed Study Plan

Year 1 Semester 1

Course	Course Title	Course Hours			Course Type	Prerequisite	Major GPA
		LEC	PRAC	CRD			
EEM 600	Principles of Artificial Intelligence	4	0	4	MR	--	Yes
EEM 601	Statistical Data Analysis and Research Methods	4	0	4	MR	--	Yes
EEM 602	Internet of Things (IoT)	4	0	4	MR	--	Yes
	Total	12	0	12			

Year 1 Semester 2

Course	Course Title	Course Hours			Course Type	Prerequisite	Major GPA
		LEC	PRAC	CRD			
AIE 603	Machine Learning	4	0	4	MR	Completion of three core courses	Yes
AIE 604	Deep Learning Applications	4	0	4	MR	Completion of three core courses	Yes
AIE 605	Special Topics in Artificial Intelligence	4	0	4	MR	Completion of three core courses	Yes
	Total	16	0	16			

Year 2 Semester 3

Course	Course Title	Course Hours			Course Type	Prerequisite	Major GPA
		LEC	PRAC	CRD			
EEM 699-Thesis	Masters Thesis	12	0	12	MR	Completion of six core courses.	NO
	Total	12	0	12			

Total credit hours required in the program = 36

Course Description

EEM 600: Principles of Artificial Intelligence	(4-0-4)
Prerequisite: None	
Historical background and foundations of artificial intelligence. Major Development of AI; the Philosophical Background. Introduction to concepts of Intelligent agents and their use for Engineering applications. The search algorithms and concepts. Classes of AI and Concepts of computational AI. Artificial Intelligence verses Machine learning and Deep Learning. AI as Logical formalisms, propositional and first order predicate calculus Planning, from STRIPS to other Partial Order Planning Probability and uncertainty, the Bayesian inference and Bayes computational networks. Machine learning. The hill climbing and genetic programming. Other classes of AI Computational Systems. The Ethical Principles of AI. AI Management, principles, and fundamentals. Data driven AI and Depth of machine learning, self-driving cars, intelligent assistants (e.g., Alexa), chatbots (e.g., ChatGPT). Applying intelligent algorithms to real engineering problems using recent coding platforms.	

EEM 601: Statistical Data Analysis and Research Methods	(4-0-4)
Prerequisite: None	
This applied course is designed for graduate students. The goals of the course are to develop the skills necessary to identify appropriate statistical techniques, estimate models, analyze data, and interpret results for independent research and to critically evaluate contemporary research using advanced quantitative methods. The course will include descriptive and inference statistics, hypothesis testing, confidence intervals, processing and analysis of research data using different parametric and nonparametric statistical methods, regression analysis for linear and nonlinear models, and introduction to the design of experiments. Research methods, research ideas through literature survey, planning and designing specific methods for conducting research, analyzing data using scientific methodology and presenting research results in a systematic and objective way.	

EEM 602: Internet of Things (IoT)	(4-0-4)
Prerequisite: None	
This advanced course delivers an understanding of Embedded Systems and Internet of Things and their enabling smart everywhere applications, like smart grid, smart city, smart home, industrial automation, telemetry, etc. Typical architectures of IoT systems are introduced, including microcontrollers and sensors. It is industrially focused, tailored to the demands of companies that design and manufacture mobile electronic equipment which interfaces with wireless networks and applications. Students will also learn how to use typical IoT enabling communications technologies.	

AIE 603: Machine Learning	(4-0-4)
Prerequisite: 1st semester core courses.	
The purpose of the Machine Learning ML course is to present and develop practical ML skills using different ML techniques; Supervised learning, like Linear Regression, Least Squares, Statistical Estimation: MLE, MAP, Naïve Bayes Classifier, Linear Classification Models: Logistic Regression, Support Vector Machines (SVMs), Multi-class SVM, Kernels, Support Vector Regression. Unsupervised learning; like: Clustering: K-Means Clustering, Spectral Clustering, Agglomerative Clustering. Reinforcement learning in both classical and deep learning techniques. In addition to dimensionality Reduction for PCA, SVD, ICA, autoencoders, and anomaly detection. Learners will learn how to extract predictions from data using a programming coding environment. All the computational algorithms will be used for advanced engineering aspects of the applications.	

AIE 604: Deep Learning Applications	(4-0-4)
Prerequisite: 1st semester core courses	
This course provides a comprehensive exploration of deep learning applications, covering essential neural network architectures and the three main paradigms of deep learning: supervised, unsupervised, and reinforcement learning. Students will learn to develop and deploy advanced machine learning models with applications in real-world engineering and industry. Key topics include convolutional neural networks (CNNs) for image processing, recurrent neural networks (RNNs) and LSTMs for sequential data, optimization methods like Adam, and regularization techniques such as dropout and batch normalization. The course also introduces students to deep reinforcement learning (DRL) Basics for decision-making and autonomous systems. Applications covered in this course span IT, healthcare, FinTech, computer vision, traffic management, agriculture and others. this course also helps students enhance their innovation and entrepreneurship abilities, preparing them for impactful roles across diverse sectors.	

AIE 604: Special Topics in Artificial Intelligence	(4-0-4)
Prerequisite: 1st semester core courses	
AI has several demanding engineering applications. For this course, depending on the request of the requirements of majority of the M.Sc. Candidates, special topics in AI in engineering will be offered. This course will focus on one (or multiple) of the following topics that is used in Artificial Intelligence. Topics include AI ENGINEERING FOR HEALTHCARE, MECHATRONICS AND AI FOR INDUSTRY 4.0 ENGINEERING, EDUCATIONAL AI SYSTEMS, CIVIL ENGINEERING AND TRANSPORTATION AI SYSTEMS, ROBOTICS ENGINEERING APPLICATIONS, NATURAL LANGUAGE PROCESSING SYSTEMS, INTELLIGENT ASSISTANTS.	

EEM 699: Thesis	(12-0-12)
Prerequisite: Completion of the (24) credit courses.	
The last semester of the Master program provides the student with an opportunity to undertake extensive investigation of an advanced or specialized topic relating to his/her MSc program; to provide the opportunity to plan and execute a significant project of research, investigation or development.	