Master of Science in Artificial Intelligence (<u>MSAI</u>)									
Course Name	Foundations of Ar	rtificial Intelligence	أساسيات الذكاء الاصطناعي						
Course Information	Course Code	Course No.	Credit Hour	Prerequisite(s)					
	0911-1660	660	3 (3-0-6)						
Course Track	Program Core		Electives						

Course Description. Now-a-days in almost all applications, we expect computers to act and perform like human! How possibly a computer could achieve that? The answer is Artificial Intelligence (AI). This course is designed to introduce the theory and practices of AI and will be strongly method-oriented. The course starts with an overview of AI (motivation, history, approaches, key domains, examples). Then, the course will cover the mathematical foundations that utilized in AI and its related subjects. Namely, it builds upon fundamental concepts in linear algebra, probability theory, multivariate calculus and statistics. Next, it provides full details of the rationality concept, rational agents, agent programs and task environments. It includes how rational agents will deal with uncertain knowledge and reasoning in decisions and acting under uncertainty with focusing on probabilistic reasoning and Bayesian networks topics. The topic of reasoning will be elaborated by covering logical agents, propositional and predicate logic with inferences, satisfiability and model construction, modeling with logic etc. The classical planning problem will be briefly explained. The course also covers how a problem-solving agents solve problems using uninformed search, Heuristic or Informed Search, and Local Search techniques. Moreover, AI game theory will be discussed including Adversarial Search algorithms and Constraint Satisfaction Problems.

Course Outcomes. After the completion of this course, the student will be able to:

- 1. **Describe** basic concepts and methods related to AI **[A]**
- 2. **Understand** the mathematical concepts behind some of the key methods in artificial intelligence and machine learning. **[C]**
- 3. **Examine** the characteristics of Agent Task Environments and find a suitable agent program based on that **[B]**
- 4. Apply and compare different techniques for goal search for a specific AI problem [E]
- 5. **Identify** differences between various inference techniques under the reasoning paradigm **[A]**
- 6. Analyze a reasoning problem with appropriate techniques and construct a model as a solution [C]

Assessment Policy (TC)	Assignments	10%	Quiz	10%	Capstone	20			
	Midterm Exam	20%	Final Exam	40%	Project	%			
Textbook	Stuart Russell, Peter Norvig, " Artificial Intelligence: A Modern Approach ", Prentice Hall, 4 th Edition, 2020, ISBN: 0134610997								
References	 Kevin Warwick, "Artificial Intelligence: The Basics", Routledge; 1st Edition 2011, ISBN: 0415564832. Marc Peter Deisenroth, A. Aldo Faisal, Cheng Soon Ong, "Mathematics for Machine Learning", Cambridge University Press, 2020, ISBN-13: 978-1108455145. 								