



Faculty of Engineering and Technology
Department of Electrical and Computer Engineering

Course title/code	Artificial Intelligence	ENCS3340
Semester/Year	Second Semester 2023 - 2024	
Compulsory/Elective	Compulsory	
Prerequisites	COMP233, (COMP142 or COMP230)	

Instructors	Office Location	Office Hours	Email	Section, Class Time, and Venue
Dr. Yazan	Masri517	See Ritaj	yabufarah@birzeit.edu	Sect: 1, SMW, 9:00 – 9:50, Masri110 Sect: 4, SMW, 12:00 – 12: 50, Masri404
Dr. Ismail	Masri517		ikhater@birzeit.edu	Sect: 2, SMW, 10:00 – 10: 50, Masri110
Dr. Aziz	Masi219		aqaroush@birzeit.edu	Sect: 3, TR, 12:30 – 13:50, Masri306

Course Description	A study of what is required to produce intelligent, human-like behavior in a computer system. Fundamental issues in intelligent systems. Search and optimization methods. Knowledge representation and reasoning. Learning. Agents. Multi-agent systems. Game theory and auctions.
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Course Objectives	<ul style="list-style-type: none"> The primary objective of this course is to introduce the basic principles and applications of Artificial Intelligence. The emphasis of the course is on teaching the fundamentals, and not on providing a mastery of specific commercially available software tools or programming environments. In short, this is course is about the design and implementation of intelligent agents---software entities that perform useful tasks with some degree of autonomy. Upon successful completion of the course, students will have an understanding of the basic areas of artificial intelligence including problem solving, knowledge representation, reasoning, decision making, perception and action, and learning -- and their applications (e.g., data mining, information retrieval). Students will also be able to design, implement key components of intelligent agents of moderate complexity in Java and/or Python, and evaluate their performance.
Student Outcomes (SOs)	<p>C: Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability</p> <p>E: Ability to identify, formulate, and solve engineering problems.</p> <p>H: The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context</p>

	Course contents	SO1	SO2	SO3
1	Intelligent agents		*	
2	Search: Informed and uninformed search algorithms, Adversarial search, and Constraint satisfaction problems	*	*	*

3	Learning from observations	*	*	*
4	Introduction to Reasoning Under Uncertainty	*	*	

Textbook and References	<ul style="list-style-type: none"> Textbook: Russel and Norvig, Artificial Intelligence: A modern approach 4th edition. Pearson, 2021 Reference: Artificial Intelligence: A Guide to Intelligent Systems 3rd edition
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Assessment Criteria	Midterm Exam	25%
	3-4 Quizzes	10%
	Final Exam	40%
	Two Projects	25%

Topics			
Introduction	<ul style="list-style-type: none"> Introduction 		
Solving Problems by Searching	<ul style="list-style-type: none"> Problem Formulation and Solving by Search Uninformed Search [DFS, BFS, IDDFS, Uniform Cost Search] Heuristic (Informed) Search [Basics, Greedy search, A* search, IDA*] Local Search for Optimization Problems [Hill Climbing, Simulated Annealing, Genetic Algorithms] Constraint Satisfaction Problems Adversarial Search and Games 		
	Machine Learning	<ul style="list-style-type: none"> Introduction and Basic Concepts Supervised Learning <ul style="list-style-type: none"> ✓ K-Nearest Neighbors ✓ Decision Trees ✓ Naïve Bayes ✓ Neural Networks Model Evaluation and Assessment Underfitting and Overfitting 	
		<ul style="list-style-type: none"> Unsupervised Learning <ul style="list-style-type: none"> ✓ Basic Concepts ✓ K-Means ✓ Model Evaluation Reinforcement Learning 	
		Probabilistic Reasoning	<ul style="list-style-type: none"> Reasoning Under Uncertainty Bayesian Network [Representation, Inference, and Learning]

Additional Notes	
Assignments	No late assignments
Exams	Comprehensive exams
Makeup Exams	No makeup exam
Attendance	Your attendances are very important
Key to a good grade	Reading the TEXTBOOK and HANDOUT + DOING the PROJECTS