DeCAIR Course Syllabus Form

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Work Package Number & Title	Work Package 2: Development of new MSc and BSc programs in AIR		
Activity Number & Title	Activity 2.2: Designing and developing syllabi and content for the agreed upon courses in the new programs		
Work Package Leader	Francesco Masulli, University of Genoa		
Due Date of Delivery	15/2/2024	**Project Month**	M14
Submission Date	22/10/2023	**Project Month**	M33

Revision History

Version	Date	Author	Description	Action *	Page(s)
1	17/10/2023	Dr. Ahmad Alzubi	Original (base) document	C	1-5
2	22/10/2023	Ahmad Bataineh		U	
3					
4					

(*) Action: C = Creation, I = Insert, U = Update, R = Replace, D = Delete

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Course title	Introduction To Artificial Intelligence
Course number	AI 240
Credit hours (lecture and lab)	3 (3 + 0)
ECTS (weekly contact and self-study load)	6 (3 + 3)
Prerequisites/co-requisites by course number and name	CS284 Analysis And Design Of Algorithms
Prerequisites by topic (other than the formal prerequisites above)	Students are assumed to have a good background in mathematics, programming, and the design of algorithms
Level and type (compulsory, elective)	Bachelor mandatory course
Year of study and semester	second year, first semester
Catalogue description	An introduction to the basic knowledge representation, problem solving, and learning methods of artificial intelligence. Topics will include specific AI techniques, a range of application areas, and connections between AI and other areas of study (i.e., philosophy, psychology). Techniques may include heuristic search, automated reasoning, machine learning, deliberative planning and behavior-based agent control. Application areas include robotics, games, knowledge representation, and natural language processing.
Objectives	1. Introduce basic knowledge about artificial intelligence. 2. Introduce AI techniques, a range of application areas, and connections between AI and other areas of study 3. Introduce mobile robot locomotion and kinematics.
Intended learning outcomes	Upon successful completion of this course, students will be able to:

No	Intended learning Outcome (ILO)	Program learning outcome (PLO)*
1	Understand the objectives, functions, and use cases of modern Artificial Intelligence.	1
2	Learn the foundation of intelligent agents, including AI agent capacities, design, functions, and structure.	1
3	Understand and implement search and adversarial (game) algorithms.	1,2
4	Learn different logic formalisms and decision-making in knowledge representation, reasoning, and planning problems	1

	5	Have a glance at machine learning algorithms and extracting knowledge models from data	1
	6	Understand different modern AI areas, including NLP, Chatbots, Robotics, and Computer vision.	1
	7	Demonstrate practical experience by designing and implementing various applications or systems that act intelligently and learn from experience.	6
	(*) The PLOs are listed in the appendix		
Teaching and learning methods	Development of ILOs is promoted through the following teaching and learning methods: Methods include lectures, labs, case studies, assignments, and a team project. Different software tools are used throughout the course, labs, and implementation of the mechatronics project. The project is suggested to be done by a student, (or group of two students). Deliverables for the project are a written report and presentation/demo of the project due at the end of the semester. • Lectures are delivered in campus. Related material is provided online over student's course link (E-Learning) • Students can study the reference material, including textbooks and provided videos. • Student will carry out an individual project. Deliverables includes a professional report and a presentation for the project in class towards end of the semester. • Student will carry out an individual practical assignments. Deliverables includes a professional reports.		
Learning material type	Textbook, class handouts, some instructor keynotes, selected videos, and access to a personal computer and the internet.		
Resources and references	A- Required book(s), assigned reading and audio-visuals: 1. Artificial Intelligence: A Modern Approach, by Stuart Russell and Peter Norvig, 4th Edition, 2020 (Ref#1) B- Recommended book(s), material, and media: 1. Artificial Intelligence: Foundations of Computational Agents, by David L. Poole and Alan K, 3rd Edition, 2023 (Ref #2) 2. Artificial Intelligence with Python, by Alberto Artasanchez and Prateek Joshi, 2nd Edition, 2020 (Ref #3)		
Topic outline and schedule			

Week	Topic	ILO	Resources
1	Introduction	1	Ref#1
2	Intelligent Agent	1	Ref#1 and Ref#2

	3	Solving Problems by searching	1	Ref#1
	4	Search in Complex Environments	1	Ref#1 and Ref#2
	5	Adversarial Search and Games	2	Ref#1
	6	Logical Agents	2	Ref#1
	7	Knowledge Representation	1	Ref#1
	8	Automated Planning	1	Ref#1
	9	Quantifying Uncertainty	6	Ref#1
	10	Machine Learning (MLP/NN/DL/RL)	1	Ref#1 and Ref#3
	11,12	NLP and Chatbots	6	Ref#1 and Ref#3
	12,13	Robotics	1	Ref#1
	13,14	Computer Vision	1	Ref#1
	14,15	The Social Impact of AI	6	Ref#2

Evaluation tools

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment tools:

Assessment tool	Mark	Topic(s)	Time
Practical assignments	15%	All topics	W2-W12
Midterm exam	30%	Introduction through Automated Planning	W8
Individual Project	15%	All topics	W14
Final exam	40%	All material	W16
Total	**100%**		

Student requirements

The student should have a computer and internet connection.

Course policies

A- Attendance policies:

- Attendance is required. Class attendance will be taken every class and the university polices will be enforced in this regard.

B- Absences from exams and not submitting assignments on time:

- A makeup exam can be arranged for students with legal excuse.
- Assignments submitted late, but before announcing or discussing the solution can be accepted with 25% off penalty for each day late.
- Term project report and presentation must be submitted on time (no delays).

C- Health and safety procedures:

- All health and safety procedures of the university and the school should be followed.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

- Cheating is prohibited under JUST strict laws.
- All submitted work must be student's authentic work.
- Other text or code must be properly quoted with clear source specification.
- Cheating will not be tolerated.

	E- Available university services that support achievement in the course: • Microsoft Teams team and Moodle course page • Robotics and Artificial Intelligence Lab for to demonstrate and implement the practical aspects of the course.
Additional information	None

Appendix

Learning Outcomes for the MSc in in Mechatronics Engineering

Students who successfully complete the MSc in Mechatronics Engineering will be able to:

1- Integrated systems: Work with, and develop, integrated systems through all stages. This includes design, operation, fault diagnosis and troubleshooting.
2- Leadership: Lead industry modernization and automation effort; make decisions when selecting, procure and commission advanced engineering systems; lead and manage their multidisciplinary technical teams.
3- Innovation: Develop competitive and innovative technical solutions to complex engineering problems while driving innovations into the resulting product.
4- Broad-based: Adapt research and development to achieve optimal technical solutions, and take into account socioeconomic, environmental, and innovative technology.