

Course Title	Foundations of Artificial Intelligence				
Course Code	AI600				
Course Type	Compulsory				
Level	Master (2 <sup>nd</sup> cycle)				
Year/Semester	1 <sup>st</sup> Year/1 <sup>st</sup> Semester				
Teacher's Name	TBA				
ECTS	8	Lectures/ week	Up to 6 Teleconferences	Laboratories/ week	None
Course Purpose and Objectives	This course introduces the fundamental concepts, theory, and algorithmic ideas of Artificial Intelligence (AI). Specifically, the course contains an introduction to agents, uninformed and heuristic search, logical agents, introduction to planning and constraint satisfaction, adversarial search for games, AI ethics and philosophical foundations.				
Learning Outcomes	<p>Upon successful completion of this course students should be able to:</p> <ul style="list-style-type: none"> <li>• Learn the basic concepts in Artificial Intelligence such as Agents problems, Actions and Environments.</li> <li>• Identify the type of problem and environment that an intelligent agent operates.</li> <li>• Represent the problem, constraints and goals with formal methods.</li> <li>• Apply search techniques including uninformed and heuristic search for problem solving.</li> <li>• Model and solve standard constraint satisfaction problems.</li> <li>• Identify optimal strategies in adversarial problem settings, such as games.</li> <li>• Recall and apply planning techniques for constructing effective plans for achieving an agent's goals.</li> <li>• Identify ethical issues involved in AI applications.</li> <li>• Apply related regulations when deploying AI applications.</li> </ul>				
Prerequisites	None		Co-requisites	None	
Course Content	<p><u>Introduction:</u> Introduction to AI, definitions and history of AI.</p> <p><u>Intelligent Agents:</u> Problem formulation, goals, constraints environment and actors/agents.</p> <p><u>Search:</u> Solving problems by uninformed search.</p> <p><u>Informed Search:</u> Solving problems by searching using informed techniques involving heuristics.</p> <p><u>Beyond classical search:</u> local search algorithms, nondeterministic actions, partial observations, online search.</p>				

	<p><u>Game theory</u>: Selecting an optimal strategy in games using adversarial search techniques.</p> <p><u>Stochastic &amp; Partially Observable Games</u>: Selecting an optimal strategy in games with non-deterministic actions and partial observability</p> <p><u>Constraint Satisfaction Problems</u>: Solving problems by finding acceptable solutions under constraints: Problem formulation and solving techniques.</p> <p><u>Planning</u>: Problem formulation construction of goal achieving plans: theory and practice.</p> <p><u>Planning and acting in the real world</u>: schedules and resources, hierarchical planning, nondeterministic domains, multi-agent planning.</p> <p><u>Philosophical foundations of AI</u>: Weak AI, strong AI, implications to dualism and consciousness.</p> <p><u>Ethics and AI</u>: Integrating ethics to AI systems, accountability and interpretability of AI systems (e.g. autonomous vehicles). Implications of AI in military applications. Automatic decision-making and algorithmic biases. Implications of AI in employment.</p> <p><u>Regulatory Framework of AI</u>: Existing regulatory frameworks and legal issues arising from AI applications.</p> <p>All lectures will consist of a theoretical part presenting concepts and techniques and a practical part where the AI techniques will be applied for problem solving.</p>						
Teaching Methodology	E-Learning						
Bibliography	<p>“Artificial Intelligence: A Modern Approach” (Latest Edition) by Stuart Russell and Peter Norvig.</p> <p>N. Bostrom and E. Yudkowsky, “The ethics of artificial intelligence”. In W. M. Ramsey and K. Frankish, editors, The Cambridge Handbook of Artificial Intelligence, pages 316-334, Cambridge University Press. Latest Edition.</p>						
Assessment	<table border="1" style="width: 100%;"> <tr> <td style="width: 60%;">Final Examination</td> <td style="width: 40%; text-align: center;">50%</td> </tr> <tr> <td>Assignments/On-going evaluation</td> <td style="text-align: center;">50%</td> </tr> <tr> <td></td> <td style="text-align: center;">100%</td> </tr> </table>	Final Examination	50%	Assignments/On-going evaluation	50%		100%
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	100%						
Language	English						