Introduction to AI
Course Syllabus - Spring 2024

		Start of lectures 31/01/2024 (Rescheduled for 03/02/2024)
Weeks 1-2 **Introduction to AI**	Lectures 1–2 03-05/02	• What Is AI? • The Foundations of Artificial Intelligence • The History of Artificial Intelligence • The State of the Art • Risks and Benefits of AI
Weeks 2-3 **Intelligent Agents**	Lectures 3–4 07-12/02	• Agents and Environments • Good Behaviour: The Concept of Rationality • The Nature of Environments • The Structure of Agents
Weeks 3-5 **Solving Problems by Searching**	Lectures 5-8 14-26/02	• Search Algorithms • Uninformed Search Strategies • Informed (Heuristic) Search Strategies • Tree search and graph search • A* algorithm and its properties. • Memory efficiency search algorithms
Weeks 5 - 6 **Beyond Classical Search**	Lectures 9-10 28/02 & 04/03 **Tuesday 05/03** **Thursday 07/03**	• Local Search Algorithms and Optimization Problems • Local Search in Continuous Spaces • Searching with Nondeterministic Actions • Searching with Partial Observations **Quiz # 1** **MINI-PROJECT out (Week 6)**
Weeks 6 to 7 **Adversarial Search**	Lectures 11-13 06-13/03	• Games • Optimal Decisions in Games • Alpha--Beta Pruning • Imperfect Real-Time Decisions • Stochastic Games • Partially Observable Games • Alternative Approaches • Limitations of Game Search Algorithms
Midterm Exams Week 16-23/03/2024		

Weeks 9 to 11 **Constraint Satisfaction Problems**	Lectures 14-17 08/04 &15-22/04	• Defining Constraint Satisfaction Problems • Constraint Propagation: Inference in CSPs • Backtracking Search for CSPs • Local Search for CSPs • The Structure of Problems
Weeks 11 to 12 **Logical Agents**	Lectures 18-19 24-29/04	• Knowledge-Based Agents • The Wumpus World • Logic • Propositional Logic: A Very Simple Logic • Propositional Theorem Proving • Effective Propositional Model Checking • Agents Based on Propositional Logic
Weeks 12 to 14 **First-Order Logic** **+** **Inference in First-Order Logic**	Lectures 20-23 06-15/05 **Tuesday 07/05**	• Representation Revisited • Syntax and Semantics of First-Order Logic • Using First-Order Logic • Knowledge Engineering in First-Order Logic • Propositional vs. First-Order Inference • Unification and Lifting • Forward Chaining • Backward Chaining • Resolution
Week 15 **Classical Planning** **+** **(Planning and Acting in the Real World** **Depending on advancement in the course coverage)**	Lectures 24-25 20-22/05 **Tuesday 07/05** **Friday 10/05**	• Definition of Classical Planning • Algorithms for Planning as State-Space Search • Planning Graphs • Other Classical Planning Approaches • Analysis of Planning Approaches • Time, Schedules, and Resources • Hierarchical Planning • Planning and Acting in Nondeterministic Domains • Multiagent Planning **Quiz # 2** **Mini project due**
Last day of classes 23/05/2024		
Final Exams Period: **Saturday 25/05/2024 - 01/06/2024**		