George Mason University  
College of Engineering, School of Computing, Department of Computer Science  

CS 580 Introduction to Artificial Intelligence  

Meeting times:  Tuesday, Thursday 10:30 am – 11:45 am  
Meeting location:  Online on Blackboard  

Instructor:  Dr. Gheorghe Tecuci, Professor of Computer Science  
Office hours:  Online by appointment, for questions unrelated to the course. Course-related questions will be addressed during the course online meetings.  
E-mail:  tecuci at gmu dot edu  

Graduate Teaching Assistant:  Juan Huang  
E-mail:  jhuang21 at gmu dot edu  
Office hours:  Thursdays, 3-4 pm at ENGR 4456, 4-5 pm online (link).  

Course Description  
Artificial Intelligence is the Science and Engineering domain which is concerned with the theory and practice of developing systems that exhibit the characteristics we associate with intelligence in human behavior, such as reasoning, problem solving and planning, learning and adaptation, natural language processing, and perception. This course is a broad introduction to the basic principles and the major methods of Artificial Intelligence, preparing the students to build complex systems incorporating capabilities for intelligent processing of information. We will cover the main results from three waives in the evolution of AI: Handcrafted Knowledge (problem solving as search; constraint satisfaction problems; adversarial search; logic and production systems; resolution and prolog; ontologies and the semantic web), Statistical Learning (probabilistic reasoning basics; Bayesian networks inference and learning; machine learning basics; inductive learning of decision trees; very fast decision trees; neural networks and back propagation; deep learning; recurrent neural networks; convolutional neural networks, large language models), and Contextual Adaptation (evidence-based reasoning; instructable agents).  

Students will have accounts on Blackboard and can download the lecture notes by going to courses.gmu.edu and logging in using their Mason ID and passwords. They should also be familiar with Zoom and Microsoft Teams.  

Online Teaching and Class Attendance  
This is a synchronous online class and your class attendance is required.  
A few days before each class meeting the lecture (pdf and recording) will be posted on Blackboard.  
Your assignment is to watch them before the meeting and to do the associated exercises.  
During the class meetings I will answer questions about the posted lectures and discuss the exercises to improve your understanding of course material.  

Course Topics & Schedule  

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<th>Week 1</th>
<th>Tuesday</th>
<th>Thursday</th>
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<tr>
<td>Jan 16</td>
<td>Artificial Intelligence and Intelligent Agents</td>
<td>Jan 18</td>
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<td>Problem-Solving as Search</td>
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<td>Week 2</td>
<td>Jan 23</td>
<td>Problem-Solving as Search</td>
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<td>Week 3</td>
<td>Jan 30</td>
<td>Adversarial Search</td>
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<td>Week 4</td>
<td>Feb 6</td>
<td>Resolution and Prolog</td>
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<td>Week 5</td>
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<td>Ontologies</td>
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<td>Week 6</td>
<td>Feb 20</td>
<td>Midterm</td>
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<td>Week 7</td>
<td>Feb 27</td>
<td>Bayesian Networks Inference and Learning</td>
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<td>Week 8</td>
<td>Mar 5</td>
<td>Spring Recess (no class)</td>
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<td>Week 9</td>
<td>Mar 12</td>
<td>Bayesian Networks Inference and Learning</td>
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<td>Week 10</td>
<td>Mar 19</td>
<td>Inductive Learning of Decision Trees</td>
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<td>Week 11</td>
<td>Mar 26</td>
<td>Inductive Learning of Decision Trees</td>
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<td>Week 12</td>
<td>Apr 2</td>
<td>Neural Networks</td>
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<td>Week 13</td>
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<td>Deep Learning</td>
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<td>Week 14</td>
<td>Apr 16</td>
<td>Evidence-based Reasoning</td>
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<td>Week 15</td>
<td>Apr 23</td>
<td>Instructable Cognitive Agents</td>
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<td>Week 16</td>
<td>Apr 30</td>
<td>Reading Day (no class)</td>
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**Outcomes**
- Knowledge of and ability to apply uninformed and heuristic search methods;
- Knowledge of and ability to apply knowledge representation and reasoning methods based on first-order logic;
- Knowledge of and ability to apply basic probabilistic reasoning methods;
- Knowledge of and ability to apply basic machine learning methods.

**Grading Policy**
- Mid-term exam: 40%
- Final exam: 60%
Absence from the midterm exam and the final exams will not be excused except for doctor-certified sickness on the day of the exam or quiz that prevented you from attending. If absence from a quiz or exam is unexcused, the grade will be entered as 0.

Exams

Part 1 closed-book exam with LockDown Browser
(https://web.respondus.com/he/lockdownbrowser/).

Part 2 open-book exam

Dates (mark your calendar)
- Mid-term exam: 02/20/2024
- Final exam: 05/02/2024

Honor Code Policy
Mason is an Honor Code university. You are expected to abide by the University's honor code (http://oai.gmu.edu/mason-honor-code/), as well as the CS department Honor Code (http://cs.gmu.edu/resources/honor-code/). Any collaboration between students on assignments or exams is unacceptable.

Required Reading
- Tecuci G., *Lecture Notes in Artificial Intelligence*, 2023 (available on Blackboard)

Recommended Reading

Other Readings
- Gathering Strength, Gathering Storms: One Hundred Year Study on Artificial Intelligence, The One Hundred Year Study on Artificial Intelligence (AI100) 2021 Study Panel Report.

Email Communication
• For all the issues related to the course, always email to both tecuci at gmu dot edu and jhuang21 at gmu dot edu.
• You are required to always use your Mason email and include CS580 in the subject.
• Do not send us email through Blackboard.

Mason Email Accounts
Students must activate their Mason email accounts to receive important University information, including messages related to this class.

Office of Disability Services
If you are a student with a disability and you need academic accommodations, please see Dr. Tecuci and contact the Office of Disability Services (ODS) at 993-2474. All academic accommodations must be arranged through the ODS (http://ds.gmu.edu/).

Other Useful Campus Resources
• Writing Center: A114 Robinson Hall; (703) 993-1200; http://writingcenter.gmu.edu
• University Libraries “Ask a Librarian” http://library.gmu.edu/ask
• Counseling and Psychological Services (CAPS): (703) 993-2380; https://caps.gmu.edu/

University Policies
The University Catalog, http://catalog.gmu.edu, is the central resource for university policies affecting student, faculty, and staff conduct in university affairs. You may also review the University Policy web site, http://universitypolicy.gmu.edu/