

George Mason University
The Volgenau School of Engineering
Department of Computer Science
CS 580 Introduction to Artificial Intelligence

Meeting time: Thursday 4:30 pm – 7:10 pm

Meeting location: Planetary Hall 206

Instructor: [Dr. Gheorghe Tecuci](#), Professor of Computer Science

Office hours: Thursday 7:20pm – 8:10pm

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Office hours: Tuesday 6:00pm – 8:00pm and Wednesday 7:20pm - 8:20pm

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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, planning and problem solving, learning and adaptation, natural language processing, and perception. This course presents the basic principles and the major methods of Artificial Intelligence, preparing the students to build complex systems incorporating capabilities for intelligent processing of information. Covered topics include: heuristic search and game playing, knowledge representation, logic and probabilistic reasoning, machine learning, knowledge engineering and intelligent agents, Common LISP, Prolog, and SPARQL. The students will also learn about the Disciple agent development environment created in the [Learning Agents Center](#) of George Mason University, as well as other artificial intelligence tools, such as the Weka machine learning workbench, and the SPARQL endpoints for the semantic web. 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.

Course Topics

- Overview of Artificial Intelligence and Intelligent Agents
- Problem Solving through Search
- Knowledge Representation and Reasoning in Logic
- Common LISP
- Ontologies and the Semantic Web
- Probabilistic Reasoning and Learning
- Machine Learning
- Knowledge Engineering and Intelligent Agents

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;
- Ability to implement basic AI methods in Lisp, Prolog or a knowledge-based systems development environment;
- Ability to identify and apply basic AI methods to a given problem.

Grading Policy

There will be several homework assignments, a mid-term exam and a final exam.

The course grade will be determined as follows:

- Assignments: 33.33%
- Mid-term exam: 33.33%
- Final exam: 33.33%

Exam Dates

- Mid-term exam: 10/19/2017, starting at 4:30pm
- Final exam: 12/14/2017, starting at 4:30pm

Assignments Deadline Policy

Assignments are due (on paper) before the beginning of the class.

No late assignments will be accepted because their solution will be discussed in class the day they are due.

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/) (<http://oai.gmu.edu/mason-honor-code/>), as well as the [CS department Honor Code](http://cs.gmu.edu/resources/honor-code/) (<http://cs.gmu.edu/resources/honor-code/>).

Any collaboration between students on assignments or exams is unacceptable. We reserve the right to use MOSS

(<http://theory.stanford.edu/~aiken/moss/>) to detect plagiarism in the programming assignments.

Required Reading

- Tecuci G., *Lecture Notes in Artificial Intelligence*, 2017 (available on Blackboard)

Recommended Readings

- Russell S., and P. Norvig P., [*Artificial Intelligence: A Modern Approach*](#), Prentice Hall, Third edition (ISBN-13: 978-0-13-604259-4, 2010), Second edition (ISBN: 0-13-790395-2, 2003).

This book is on reserve for CS580 at the Johnson Center Library, and may be borrowed for 2 hours. To borrow it, you will need to provide its title and call number, as follows: Artificial Intelligence, 3rd ed., Q335.R86 2010

- Graham P., [*ANSI Common Lisp*](#), Prentice Hall, ISBN: 9780133708752, available on line.

Other Useful Readings

- Tecuci, G., Marcu, D., Boicu, M., Schum, D.A., *Knowledge Engineering: Building Cognitive Assistants for Evidence-based Reasoning*, Cambridge University Press, 2016.
- Witten, I., Frank E., Hall M., *Data Mining: Practical Machine Learning Tools and Techniques*, Morgan Kaufmann, 2011. Free access on-campus from <http://proquest.safaribooksonline.com/book/-/9780123748560>
- Mitchell, T.M., *Machine Learning*, New York: McGraw Hill, 1997. See also 2015-2016 chapters at <http://www.cs.cmu.edu/~tom/NewChapters.html>
- Poole D.L. and Mackworth A.K., *Artificial Intelligence: Foundations of Computational Agents*, Cambridge University Press, 2010.
- Nilsson J.N., *Artificial Intelligence: A New Synthesis*, Morgan Kaufmann, 1998.
- Luger G., *Artificial Intelligence: Structures and Strategies for Complex Problem Solving*, Addison Wesley, 2009.
- Tecuci G., *Building Intelligent Agents: An Apprenticeship Multistrategy Learning Theory, Methodology, Tool and Case Studies*, Academic Press, 1998.
- Giarratano J. and Riley G., *Expert Systems: Principles and Programming*, Third Edition, PWS Publishing Company, Boston, 1994.
- Wilensky R., *Common LISPcraft*, Norton & Company, 1989.
- Jones T.M., *Artificial Intelligence: A Systems Approach*, Jones and Bartlett Publishers, 2009.
- Winston P.H., *Artificial Intelligence*, Addison-Wesley, 1992.
- Winston P.H., Horn B.K.P., *LISP*, Addison-Wesley, 1989.
- Rich E., Knight K., *Artificial Intelligence*, McGraw-Hill, 1993.
- Bratko I., *PROLOG Programming for Artificial Intelligence*, Addison Wesley, 1990.
- Coppin B., *Artificial Intelligence Illuminated*, Jones and Bartlett publishers, 2004.
- Dean T., Allen J., Aloimonos Y., *Artificial Intelligence: Theory and Practice*, The Benjamin/Cummings Pub. Comp., 1995.
- Ginsberg M., *Essentials of Artificial Intelligence*, Morgan Kaufmann, 1993.
- Negnevitsky M., *Artificial Intelligence: A Guide to Intelligent Systems*, Addison Wesley, 2002.
- Steele G.L., *Common Lisp the Language*, 2nd Edition, 1990.

Email Communication

- Please use your Mason email and include CS580 in the subject of any message you are emailing to Dr. Tecuci.
- Please try to limit the size of the files you are emailing.

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 \(http://ds.gmu.edu/\)](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](https://caps.gmu.edu/) (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/>