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

CS 681 Instructable Cognitive Agents

Meeting time: Monday 4:30 pm - 7:10 pm
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 or immediately after the course online meetings.
E-mail: tecuci at gmu dot edu

Course Description

Prerequisite: CS 580 or permission of instructor

Can everybody be a programmer by teaching the computer instead of programming it?
This course presents a computational theory, methodology, and tools for the development of instructable cognitive agents that are taught rather than programmed. These cognitive agents can learn complex problem solving expertise directly from human experts, can support experts and non-experts in problem solving and decision making, can autonomously perform the learned tasks, and can teach their problem-solving expertise to students. Topics include modeling expert's knowledge, mixed-initiative reasoning based on knowledge and evidence, ontology design and development, multistrategy rule learning, and knowledge-based maintenance. Projects include the study and presentation of different approaches to instructable agents from major research groups.

Students will have accounts on Blackboard and can download the lecture notes by going to courses.gmu.edu and logging in using their Mason IDs and passwords.

Course Topics
   - Introduction to Knowledge Engineering and Instructable Cognitive Agents
   - Evidence-Based Reasoning
   - Case Studies of Evidence-Based Reasoning Agents
   - Methodologies and Tools for Agent Design and Development
   - Modeling the Problem Solving Process
   - Ontology Design and Development
   - Reasoning with Ontologies and Rules
   - Learning for Instructable Agents
   - Rule Learning
   - Rule Refinement
   - Design Principles for Instructable Cognitive Agents

Grading Policy
  - Accuracy of Projects Assessments: 10%
  - Project: 30%
  - Mid Term Exam: 30%
  - Final Exam: 30%

Absence from the midterm exam and the final exam 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 an exam is unexcused, the grade will be entered as 0.

Monitored Quizzes and Exams

We will employ the LockDown Browser (https://web.respondus.com/he/lockdownbrowser/) and the Respondus Monitor (https://web.respondus.com/he/monitor/).

Each student must have two devices:

- A computer prepared for Blackboard Respondus (with microphone and video camera connected to the computer).

- A ZOOM connection (may be on a mobile device – phone, iPad or on another computer).

The exams must be taken in a quiet, isolated room.

The ZOOM device must point from a short distance to the workplace showing the computer monitor, student hands and surroundings.

We may structure the exams in two parts:

- One following strictly the above rules.

- One that allows working out the solution on paper and copying the result in Blackboard.

Exam Dates (mark your calendar)
- Mid-term exam: 10/10/2022
- Final exam: 12/12/2022

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 Readings
- Gluck K.A. and Laird J.E. (Eds.) *Interactive Task Learning*, MIT Press, September 2019. https://mitpress.mit.edu/books/interactive-task-learning
- Tecuci G., *Lecture Notes on Instructable Cognitive Agents,* Fall 2022 (provided by the instructor).

- Tecuci G., Marcu D., Boicu M., and Schum D.A., *Knowledge Engineering: Building Cognitive Assistants for Evidence-based Reasoning,* Cambridge University Press, 2016. http://lac.gmu.edu/KEBook/
- Additional papers required or recommended by the instructor.

Email Communication
- For all the issues related to the course, always email to tecuci at gmu dot edu
- Always use your Mason email and include CS681 in the subject.
- Do not sent me 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 me and contact the Office of Disability Services (ODS) at 993-2474. All academic accommodations must be arranged through the ODS. http://ods.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; http://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/

Honor Code
You are expected to abide by the Mason honor code. Information on the university honor code can be found at http://academicintegrity.gmu.edu/honorcode/.
Additional departmental CS information:
http://cs.gmu.edu/wiki/pmwiki.php/HonorCode/CSHonorCodePolicies