

**George Mason University  
College of Engineering, 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 the computational theory 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](http://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

- Quizzes: 3%
- Accuracy of Projects Assessments: 7%
- Project: 30%
- Mid Term Exam: 30%
- Final Exam: 30%

There will be partial credit for a partially correct answer, but also negative credit for any incorrect answer. You should always solve the problems to find their answers. Guessing is a wrong strategy that will result in a negative score.

Absence from the quizzes, 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.

## 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 quizzes and the exams must be taken in a quiet, isolated room, looking at the screen. If the student looks in a different direction and/or speaks during the quiz or exam, the exam/quiz will be disregarded and 0 points will be awarded.

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: 10/18/2021
- Final exam: 12/13/2021

## 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.

## 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 2021 (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>