CS3600 Syllabus

Introduction to AI, Summer 2026, 3 credits
3:30-5:20pm

Instructor Information

Instructor	Email	Drop-in Hours & Location
Jennifer Reddig	jreddig3@gatech.edu	[Location/Link, Hours, Days]

Teaching Assistant(s)	Email	Drop-in Hours & Location
[TA Name]	[Email address]	[Location/Link, Hours, Days]

General Course Information

Description

Introduction to Artificial Intelligence will build practical understanding of what Artificial Intelligence is, the core mechanisms behind it, including probability, reasoning, and extracting decisions from data, and how these technologies are used in our world. By the end of the course, you will feel confident in your ability to apply AI principles to solve real-world problems and will have a sense of responsibility in your future AI-related endeavors. We will develop design and programming skills to build intelligent systems that can interact with the environment by learning and reasoning about the world. We will explore different methods for reasoning like informed search, probabilistic inference, uncertainty techniques, decision trees, and neural networks. This course provides a useful foundation for several courses involving intelligent systems, including (but not limited to) Machine Learning (CS4641), Knowledge-Based AI (CS4635), Computer Vision (CS4476), Robotics and Perception (CS3630), Natural Language Understanding (CS4650), and Game AI (CS4731)

Pre- &/or Co-Requisites

Basic understanding of data structures and algorithms (CS1332 or equivalent) is required. You will have to be able to read pseudocode and understand basic algorithms as they are presented to you. Much of AI concerns itself with finding fast algorithms for NP-hard problems. Familiarity with (or at least a lack of abject fear over) some basic computability theory (aka P vs NP) helps to situate many of the algorithms. As the semester continues, a familiarity with basic probability theory will also be very useful; however, we may spend some time on that in class to refresh your memory. Finally, you should feel comfortable programming on your own. The projects will be implemented in Python. The assignments this semester will be provided using Jupyter Notebooks, and we have appropriate resources to help you get started and familiar with the format. It is your responsibility to review these resources. We will spend no time explaining programming languages or syntax in class; at this point in your education and career, you've been exposed to several programming languages and are expected to be able to readily acquire new programming skills if necessary.

Course Goals and Learning Outcomes

By the end of this course, you should be able to:

- Apply search algorithms to design agents that navigate efficiently through various environments.

- Implement reward-based reinforcement learning algorithms in dynamic and uncertain conditions.

- Use probabilistic methods to localize and direct an agent in stochastic scenarios.

- Develop a probabilistic language model and evaluate its effectiveness.

- Implement deep learning models in Python using the TensorFlow library and train them with real-world datasets.
- Critically assess ethical implications and biases in AI systems, proposing solutions to mitigate these biases.
- Develop the confidence to ask questions. Every question is valuable and contributes to our shared learning journey.
- Cultivate the skills necessary for effective debugging. Each error is a steppingstone toward mastery – learning to troubleshoot thoughtfully is a key part of becoming a proficient AI practitioner.
- Develop the ability to seek out resources, research AI concepts, and take ownership of your learning. Learning to explore independently will prepare you for lifelong growth.
- Participate actively in group discussions and collaborative activities. Contribute, listen, and share your knowledge and questions openly.
- Build a growth mindset. I want to help you build resilience and confidence.

Course Requirements & Grading

Assignments are tailored to build foundational knowledge, facilitate hands-on application, and provide opportunities for reflection.

Assignment	Date	Weight
Project 1: Search		12.5%
Project 2: Reinforcement Learning		12.5%
Project 3: Bayes Applications		12.5%
Project 4: Neural Nets		12.5%
Wrappers (4)		10%
Midterm Exam		15%
Final Exam		15%
In-class activities	Every class session	10%

Extra Credit Opportunities

Opportunities for extra credit will be provided through optional challenges on certain projects. Revisions on select assignments are welcome for partial credit recovery. Submission of additional participation activities beyond the minimum required for full credit will be granted extra credit.

Description of Graded Components

Participation (10%)

These activities involve interactive group work, coding exercises, and discussions that help you apply concepts in real time. Activities are designed to facilitate peer learning and prepare you for larger assignments by diving into essential AI techniques and methodologies. There will at least one activity per class session. You are required to complete at least 2/3rds of them.

- Format: Group-based tasks, coding exercises, surveys, and brief reflection questions.
- Frequency: Each class day will have at least one activity.
- Participation Requirement: Participation is required for credit. If you miss an activity, you only need to complete 2/3rds of the available activities.
- Submission: Activities will be completed and submitted in class or via Canvas as directed.

Projects (50%)

The projects are cumulative and progressively build toward creating a functional, intelligent agent in the Zork game environment. Each project aligns with major AI concepts, such as search, reinforcement learning, and probabilistic reasoning, and each provides an opportunity to implement these techniques in increasingly complex ways. Project rubrics will be provided on Canvas.

- Project 1: Search – Implement search algorithms for pathfinding. (12.5%)
- Project 2: Reinforcement Learning – Use Q-learning to optimize decision-making. (12.5%)
- Project 3: Bayes Applications – Build a language model for text generation. (12.5%)
- Project 4: Neural Nets – Build library methods for a classification task. (12.5%)
- Submission: All project deliverables are due by 11:59 PM on the specified due date, submitted via Canvas.
- Late Policy: See the late day policy
- Revision Policy: You may revise and resubmit Projects 1–4 for up to 50% credit recovery, provided that all revisions are submitted within one week of receiving your grade. Revisions should be emailed directly to the professor for grading. GradeScope will not be re-opened. Additional testing should be completed locally.

Exams (30%)

There will be a midterm and a final exam, each worth 20% of your final grade. They will be in-person, paper and pencil exams, open note and textbook but not open internet.

- Format: Free response questions explaining how to apply AI concepts to a new environment and the benefits and drawbacks.
- Submission: Submit in person during class by the end of the class period.
- Late Policy: None. Contact professor if you cannot be in person for the exam.

Wrappers (10%)

After each assignment, you will engage in a thoughtful reflection around the real-world use of each algorithm and how you would adapt the algorithm to fit the new environment.

- Format: Short written assignment completed with paper and pencil
- Submission: Submit in person during class
- Late Policy: None. Contact professor if you cannot be in person.

Grading Scale

Your final grade will be assigned as a letter grade according to the following scale:

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

Course Materials

Course Text

Artificial Intelligence: A Modern Approach by Stuart Russell and Peter Norvig

Additional Materials/Resources

Additional readings and resources will be provided on Canvas.

Course Website and Other Classroom Management Tools

You'll need access to Python, GitHub, and Jupyter Notebooks. We will use a simulation environment (e.g., Zork) to practice and demonstrate algorithms. Detailed setup instructions will be provided in class.

Course Policies, Expectations, & Guidelines

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Attendance and/or Participation

Active participation is essential for collaborative exercises and group activities. While attendance is not mandatory, consistent engagement will support your success and enrich class discussions. Participation is a part of your grade, and most participation activities will be completed in class. If you are unable to attend class, an alternative participation activity will be provided.

Collaboration & Group Work

Collaborative projects and discussions are part of this course to reflect real-world team environments in AI. Partner work will be clearly indicated. For all other assignments, discussions with classmates are encouraged, but submitted work should be completed individually.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

You have **two** free late days to be used at your discretion throughout the semester. That means you may extend the deadline of any assignment by 24 hours twice. *The late day may not be used on in-class assignments like participation and exams*. To use your late day, comment on the Canvas assignment submission before the official deadline stating that you are using your late day and extending the deadline to XX/XX at XX:XX. After the late days are exhausted, you will receive a 20% penalty per day. Absences due to sickness or GT-approved travel do not count against the late days or late penalty.

Inclement Weather and Digital Learning Days

Should we need to cancel class last minute, you will be alerted through Canvas. Class will then be held asynchronously online.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Student Use of Mobile Devices in the Classroom

In this class we will be doing lots of coding in Jupyter notebooks to increase your interaction with the content. This means you will need to bring a (charged) web-enabled device with you to class – a laptop preferred but a tablet works too. A smart phone would be insufficient. However, please remember that your success in this class will hinge in part on your attention to in-class discussion and content: please refrain from using your device during class except at designated times and do your best to focus on the task at hand.

Campus Resources for Students

A list of resources for undergraduate students' academic success and information about advising can be found at Success at Tech. At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being (student-resource-guide (gatech.edu)

Additional Syllabus Components

Use of ChatGPT and other Large Language Models

We treat AI-based assistance, such as ChatGPT, Copilot, GPT-3, GPT-4, or similar (generally understood to be a language model with over 1 billion parameters) the same way we treat collaboration with other people: you are welcome to talk about your ideas and work with other people, both inside and outside the class, as well as with AI-based assistants. However, all work you submit must be your own. You should never include in your assignment anything that was not written directly by you without proper citation (including quotation marks and in-line citation for direct quotes).

This includes anything you did not write in your assignment without proper citation will be treated as an academic misconduct case. If you are unsure where the line is between collaborating with AI and copying from AI, we recommend the following heuristics:

- Never hit "Copy" within your conversation with an AI assistant. You can copy your own work into your conversation, but do not copy anything from the conversation back into your assignment. Instead, use your interaction with the AI assistant as a learning experience, then let your assignment reflect your improved understanding.

- Do not have your assignment and the AI agent open at the same time. Like above, use your conversation with the AI as a learning experience, then close the interaction down, open your assignment, and let your assignment reflect your revised knowledge. This heuristic includes avoiding using AI directly integrated into your composition environment: just as you should not let a classmate write content or code directly into your submission, so also you should avoid using tools that directly add content to your submission.

- In the likely event that Google Colab (or any code editor you use for your assignment(s)) integrates language-to-code generation capabilities, it is recommended that you do not activate this function. You may never have to write some pieces of code from scratch, but you will learn more by doing it yourself at least once.

Deviating from these heuristics does not automatically qualify as academic misconduct; however, following these heuristics essentially guarantees your collaboration will not cross the line into misconduct.