

CS7637: Knowledge-Based AI (FA26)

Course syllabus · Georgia Institute of Technology · Canvas course 536204

Welcome



Course Content

Start here by watching the "Welcome to 7637: Knowledge-Based AI!" lesson!



Syllabus

Find the course calendar, assignment descriptions, and policies in the course syllabus.



Assignments

Submit all work to the corresponding assignment page. Set your local time zone to see deadlines in your local time.



Forum

Join the forum to discuss with classmates, ask questions, and reply to important announcements.



Help

Need technical assistance? Administrative help? Mental health support? Check here for contacts!

Quick Links

To help with navigation, here are some of the links you'll be using frequently in this course:

- Tools: [Canvas](#) | [Ed Lessons](#) | [Primer on Peer Review](#) | [Document Formatting & Submission](#)
- Class Pages: [Fall 2026 Syllabus](#) | [Recommended Reading List](#) | [Course FAQ](#) | [Full Course Calendar](#)
- Assignments: [Homework 1](#) | [Homework 2](#) | [Homework 3](#)
- Mini-Projects: [Mini-Project 1](#) | [Mini-Project 2](#) | [Mini-Project 3](#) | [Mini-Project 4](#) | [Mini-Project 5](#)
- ARC-AGI Project: [Project Overview](#) | [Milestone A](#) | [Milestone B](#) | [Milestone C](#) | [Milestone D](#) | [Final Project](#)
- Exams: [About the Exams](#) | [Exam 1](#) | [Exam 2](#)
- Participation: [Class Participation](#)

Course Instructor



David A. Joyner, PhD

Start Here! (Well, There!)

Hi! Welcome to CS7637. This course will begin at 9AM on the first day of the semester; if you're visiting before then, return then to check the course out!

To start the class as a whole, you should start by clicking Course Content above and clicking through the "Welcome to CS7637: Knowledge-Based AI!" lesson. It will walk you through getting set up for the class and what to expect.

After that, you'll watch course lessons on [Ed Lessons](#), ask questions and chat with your classmates on [Ed Discussion](#), submit code to [Gradescope](#), and [submit assignments](#) and [take exams](#) here on Canvas.

About this Course

If you would like to read more about this class, you should check out the course syllabus for this semester, located [here on Canvas](#). Here, you'll find the course calendar, assignment descriptions, and everything else you need to succeed in this course.

Finally, as you'll see us say in several places, this course heavily utilizes the course discussion forum. That is where you'll see course announcements, get answers to your questions, participate in class discussions, and more. So, [join today!](#)

Course Calendar At-A-Glance

Below is the calendar for the Fall 2026 OMS CS7637 class. Note that assignment due dates are all Sundays at 11:59PM [Anywhere on Earth time](#) (UTC-12).

Week #	Week Of	Lessons	Deliverable	Assignment Due Date
1	08/24/2026	01, 02	Start-of-Course Survey , Syllabus Comprehension Quiz	08/30/2026
2	08/31/2026	03, 04	ARC-AGI Milestone A	09/06/2026
3	09/07/2026	05, 06	Mini-Project 1	09/13/2026
4	09/14/2026	07, 08	Homework 1 , Tic Tac Toe	09/20/2026
5	09/21/2026	09	Mini-Project 2 , Quarter-Course Survey	09/27/2026
6	09/28/2026	10, 11	ARC-AGI Milestone B	10/04/2026
7	10/05/2026	12	Exam 1 , Connect Four Basic	10/11/2026
8	10/12/2026	13, 14	Homework 2	10/18/2026
9	10/19/2026	15, 16	Mini-Project 3 , Mid-Course Survey	10/25/2026
10	10/26/2026	17, 18	ARC-AGI Milestone C , Connect Four Extended	11/01/2026
11	11/02/2026	19, 20	Mini-Project 4	11/08/2026
12	11/09/2026	21, 22	Homework 3	11/15/2026
13	11/16/2026	23, 24	Mini-Project 5 , Connect Four Multiplayer	11/22/2026
14	11/23/2026	25	ARC-AGI Milestone D	11/29/2026

15	11/30/2026	—	Final ARC-AGI Project	12/06/2026
16	12/07/2026	—	Exam 2, Connect Four Hidden Multiplayer	12/13/2026
17	12/14/2026	26	End-of-Course Survey, CIOS Survey	12/20/2026

Given above are the numeric labels for each lesson. For reference, here are those lessons' titles, with the estimated time to complete each lesson in minutes in parentheses:

• 01: Introduction to Knowledge-Based AI (45) • 02: Introduction to CS7637 (60) • 03: Semantic Networks (60) • 04: Generate & Test (30) • 05: Means-Ends Analysis (60) • 06: Production Systems (60) • 07: Frames (45) • 08: Learning by Recording Cases (30) • 09: Case-Based Reasoning (60) • 10: Incremental Concept Learning (60) • 11: Classification (45) • 12: Logic (90) • 13: Planning (75)	• 14: Understanding (30) • 15: Commonsense Reasoning (60) • 16: Scripts (30) • 17: Explanation-Based Learning (45) • 18: Analogical Reasoning (60) • 19: Version Spaces (60) • 20: Constraint Propagation (45) • 21: Configuration (45) • 22: Diagnosis (45) • 23: Learning by Correcting Mistakes (45) • 24: Meta-Reasoning (30) • 25: Advanced Topics (60) • 26: Wrap-Up (30)
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Course Assessments

Your grade in this class is generally made of five components: homeworks, mini-projects, exams, the main ARC-AGI project, and class participation. With the exception of participation activities, all assignments must be submitted to the correct place in Canvas or Gradescope by the posted deadlines; after submission, we strongly recommend returning to the assignment page and downloading your assignment to confirm you submitted the right document to the right place as we cannot give extensions for instances where the wrong file was uploaded.

Students receiving a final average of 90 or above will receive an A; of 80 to 90 will receive a B; of 70 to 80 will receive a C; of 60 to 70 will receive a D; and of below 60 will receive an F. Note that graduate students (CS7637) are evaluated at a higher standard than undergraduate students (CS4635), and so the undergraduate section's final grade distribution may be curved to match the graduate student's grade distribution.

Homework (15%)

You will complete three homework assignments in this course—[Homework 1](#), [Homework 2](#), and [Homework 3](#)—each worth 5% of your average. Each homework assignment will have one question, which you will answer in a maximum of 5 pages. These questions will cover the course material and explore your understanding of key concepts from the lectures. All assignments should be written [using JDF](#).

Mini-Projects (30%)

You will complete five mini-projects in this course—Mini-Projects [1](#), [2](#), [3](#), [4](#), and [5](#), each worth 6% of your average. Each mini-project asks you to implement some AI logic shown in the course lectures, although you are

also welcome to attempt to solve the problems using other techniques. For each of the mini-projects, you will also provide a short write-up of your approach, mainly to share with classmates and look through others' approaches. These write-ups should be written [using JDF](#). You'll submit the write-ups to Canvas and the code to Gradescope. Note that your write-up grade and your performance grade will be posted to separate categories on Canvas; each will show as being worth 15% to add to 30% for mini-projects as a whole.

ARC-AGI Project Milestones (15%) and ARC-AGI Final Project (15%)

The semester-long project is the ARC-AGI project, where you will write an agent that can solve problems on the ARC-AGI benchmark. For the project, you will complete four milestones ([A](#), [B](#), [C](#), and [D](#)) throughout the semester, and then a [final submission](#). The four milestones together are worth 15% of your average, and the final submission is worth another 15%. The milestones are there to ensure that you get started on the project early and have an opportunity to see your classmates' approaches. Each milestone, as well as the final project submission, is graded half on performance and half on a written report. These write-ups should be written [using JDF](#). You'll submit the write-ups to Canvas and the code to Gradescope. Note that your write-up grade and your performance grade will be posted to separate categories on Canvas; each will show as being worth 7.5% (for milestone performance, milestone journals, project performance, and project journals) to add to 30% as a whole.

Exams (15%)

You will take two proctored exams in this class—[Exam 1](#) and [Exam 2](#)—each worth 7.5% of your average. Each exam is 90 minutes long with 22 questions, all multiple-choice, multiple-correct with five choices and between 1 and 4 correct answers. Partial credit is awarded. Exam 1 covers lessons 01 through 12; Exam 2 covers lessons 13 through 25 and does not revisit the earlier lessons directly, though earlier concepts may appear in the context of later ones. The tests are digitally proctored. Tests will open at least one week prior to the deadline, though they may be open earlier. For more information, check out the [About the Exams](#) page.

Class Participation (10%)

One of the major strengths of large online classes is the way they allow students to have significant impact on their classmates' experiences. As such, 10% of your class grade and 10% of the time you spend on this class will be improving the course experience for other students. This is [class participation credit](#), and it can be earned in various ways: participating on the class forum; participating in peer review; completing assignment feedback surveys; participating in other activities; completing course surveys; completing the secret survey by clicking the hidden link here before the end of week 2 to indicate you read the entire syllabus; and more. There may be other mechanisms to earn participation points announced throughout the semester; check the course forum for that!

Course Policies

The following policies are binding for this course.

Official Course Communication

You are responsible for knowing the following information:

1. Anything posted to this syllabus (including the pages linked from here).
2. Anything emailed directly to you by the teaching team (including announcements via the course forum or Canvas), 24 hours after receiving such an email.

Generally speaking, we will post announcements via Canvas and cross-post their content to the course forum; you should thus ensure that your Canvas settings are such that you receive these announcements promptly, ideally via email (in addition to other mechanisms if you'd like). Georgia Tech generally recommends students to check their Georgia Tech email once every 24 hours. So, if an announcement or message is time sensitive, you will not be responsible for the contents of the announcement until 24 hours after it has been sent.

Note that this means you won't be responsible for knowing information communicated in several other methods we'll be using. You aren't responsible for knowing anything posted to the course forum that isn't linked from an official announcement. You aren't responsible for anything said in Slack or other third-party sites we may sometimes use to communicate with students. You don't need to worry about missing critical information so long as you keep up with your email and understand the documents on this web site. This also applies in reverse: we do not monitor message boxes in Canvas, and we may not respond to direct emails. If you need to get in touch with the course staff, please post privately to the course forum (either to all Instructors or to an instructor individually).

Communicating with Instructors and TAs

Communication with the course teaching team should be handled via the discussion forum. If your question is relevant to the entire class, you should ask it publicly; if your question is specific to you, such as a question about your specific grade or submission, you should ask it privately.

Our workflow is to regularly filter the forum for Unresolved posts, which includes top-level threads with no answer accepted by the original poster, as well as mega-threads with unresolved follow-ups. If your question requires an official answer or follow-up from an instructor or teaching assistant, make sure that it is posted as either a Question or as a follow-up to a mega-thread, and that it is marked Unresolved. Once an instructor or TA has answered your question, it will automatically be marked as Resolved; if you require further assistance, you are welcome to add a follow-up, but make sure to unmark the question as Resolved in order to make sure that it is seen by a member of the teaching team.

Similarly, in order to keep the forum organized, please post as a Post or Note instead of a Question if your question does not require an official response from the teaching team. For example, if you are interested in getting multiple perspectives from classmates, getting feedback on your ideas, or having a discussion that does not have a single answer, please use Post or Note instead of Question. Please reserve Question threads for questions that will likely have a single official response. TAs and instructors will regularly convert Questions to Posts or Notes that do not need a single official answer, but it will save time and allow them to focus their attention on other students if you correctly categorize your post in the first place.

Late Work

Running such a large class involves a detailed workflow for assigning assignments to graders, grading those assignments, and returning those grades. As such, work that does not enter into that workflow presents a major delay. We have taken steps to limit as much as possible the need to ever submit work late: we have made the descriptions of all assignments available on the first day of class so that if there are expected interruptions (such as weddings, business trips, and conferences), you can complete the work ahead of time. If you have technical difficulties submitting the assignment to Canvas by the deadline, post privately to the course forum **immediately** and attach your submission. Then, submit it to Canvas as soon as you can thereafter.

If due to a personal emergency, health emergency, family emergency, or other unforeseeable life event you find you are unable to complete an assignment on time, please post privately to the course forum with information regarding the emergency. Depending on your unique situation, we will share guidance on how to proceed; if the emergency is projected to delay a significant quantity of the work required for the class, we may recommend withdrawing and reattempting the class at a later date. If the emergency will likely only impact a small amount of the course, we may be able to accept the work late as a one-time exception. If the emergency takes place once you have already completed a significant fraction (at least 70%) of the coursework, we may offer an Incomplete grade to allow you to finish the class after the semester is over.

Note that depending on the nature and significance of the request, we may require documentation from the Dean of Students office that the emergency is sufficient to justify offering an incomplete grade or accepting late work. Note also that regardless of the reason, we also cannot promise any particular turnaround time for grading work that was approved to be submitted late; it may be that grades and feedback will not be returned before the end of the term, and it may be that a temporary grade of Incomplete must be entered to leave time to grade work that was accepted late.

If you are not comfortable sharing with us the nature of an emergency, or if you need more comprehensive advocacy, we ask you to go through the Dean of Students' office regarding class absences. The Dean of Students is equipped to address emergencies that we lack the resources to address. Additionally, the Dean of Students office can coordinate with you and alert all your classes together instead of requiring you to contact each professor individually. The Dean of Students is there to be an advocate and partner for you when you're in a crisis; we wholeheartedly recommend taking advantage of this resource if you are in need. You may find information on contacting the Dean of Students with regard to personal emergencies here: <https://studentlife.gatech.edu/request-assistance>

Academic Honesty

All students in the class are expected to know and abide by the Georgia Tech [Academic Honor Code](#). Specifically for us, the following academic honesty policies are binding for this class:

First, for essays, journals, and reports:

- In written essays, all sources are expected to be cited according to APA style. When directly quoting another source, **both in-line quotation marks, an in-line citation, and a reference at the end of the document** are required. When directly summarizing another source in your own words, quotation marks are not needed, but **an in-line citation and reference at the end of your document** are still required. You should consult the [Purdue OWL Research and Citation Resources](#) for proper citation practices, especially the following pages: [Quoting, Paraphrasing, and Summarizing](#), [Paraphrasing](#), [Avoiding Plagiarism Overview](#), [Is It Plagiarism?](#), and [Safe Practices](#). You should also consult our dedicated pages (from another course) on [how to use citations](#) and [how to avoid plagiarism](#).
- Any non-original figures must similarly be cited. If you borrow an existing figure and modify it, you must still cite the original figure. It must be obvious what portion of your submission is your own creation.
- In written essays, you may not copy any content from any current or previous student in this class, regardless of whether you cite it or not.
- There is one exception to these policies: unless you are quoting the course videos directly, you are not required to cite content borrowed from the course itself (such as figures in videos, topics in the video, etc.).

The assumption is that the reader knows what you write is based on your participation in this class, thus references to course material are not inferred to be claiming credit for the course content itself.

Second, for code on course projects:

- You may not under any circumstances copy any code from any current or former student in the class, or from any public project addressing the same content as the course projects, such as the ARC-AGI project or a Block World agent.
- The only code segments you are permitted to borrow are **isolated project-agnostic functions**, meaning functions which serve a purpose that makes sense outside the context of our projects (such as, for example, inverting colors in an image). Include a link to the original source of the code and clearly note where the copied code begins and ends (for example, with `/* BEGIN CODE FROM (source link) */` before and `/* END CODE FROM (source link) */` after the copied code). This is partially to emphasize what your unique project and deliverable is, and partially to protect against instances where you and a classmate both borrowed a function from the same external repository. Note that annotating and attributing code is far easier than asking a TA if you need to attribute—if you need to ask, attribute it.

Third, for proctored assessments:

- During all proctored assessments, you are prohibited from interacting directly with any other person on the topic of the exam material. This includes posting on forums, sending emails or text messages, talking in person or on the phone, or any other mechanism that would allow you to receive live input from another person.
- During all proctored assessments, you may only use the device on which you are completing the assessment; you may not use other devices, even during open-book, open-note assessments as it is not possible to know whether secondary devices are being used to consult resources or to interact with others. This means that the result of using any keyboard and mouse should be observable in the session recording.
- Finally, you may not take any content contained on proctored assessments out of the proctored assessment, such as writing down exam questions, taking screenshots, or sharing information with classmates. Any attempt to retain a copy of exam content, or to obtain or consult exam content retained by someone else, will be treated as academic misconduct. Note that while open-book tests allow you to interact with other tools, you may not copy or transcribe actual exam content into any tool that will let you retain access to that content after the exam has ended.

These policies, including the rules on all pages linked in this section, are binding for the class. Any violations of this policy will be subject to the institute's Academic Integrity procedures, which may include a 0 grade on assignments found to contain violations; additional grade penalties; and academic probation or dismissal.

Finally, note that you may not post the work that you submit for this class publicly either during or after the semester is concluded. We understand that the work you submit for this class may be valuable for job opportunities, personal web sites, etc.; you are welcome to write *about* what you did for this class, and to provide the actual work privately when requested, but we ask that you do not make your actual submissions or code publicly available; this is to reduce the likelihood of future students plagiarizing your work. Similarly, unless you notify us otherwise, by participating in this class you authorize us to pursue the removal of your content if it is discovered on any public assignment repositories, especially if it is clearly contributed there by someone else.

Note that if you are accused of academic misconduct, you are **not** permitted to withdraw from the class until the accusation is resolved; if you are found to have participated in misconduct, you will not be allowed to withdraw for the duration of the semester, nor will you be eligible for grade replacement for this class. If you withdraw anyway, you will be forcibly re-enrolled without any opportunity to make up work you may have missed while illegally withdrawn.

AI Collaboration Policy

Recent advancements in artificial intelligence—Copilot, ChatGPT, etc.—can be great resources for improving your learning in the course, but it is important to ensure that their benefits are targeted at your *learning* rather than solely at your *deliverables*. Toward that end, the same academic integrity policy above applies to AI assistance: you are welcome to consult with AI agents just as you would consult with classmates, discuss ideas with friends, and seek feedback from colleagues. However, just as you would not hand your device to someone else to directly fix or improve your classwork, so also you may not copy anything directly from an AI agent into your document, nor let an AI agent directly generate content for your submission. This rule means you should disable any AI assistance more advanced than a grammar checker inside your word processors and IDEs. Note that any concrete evidence of direct plagiarism of content from AI without proper citation may be grounds for deductions that go beyond just the area of the assignment where the plagiarism took place; for example, if your response to one of five questions on a particular assignment contains clear indicators of plagiarism from AI, the penalty assigned may go beyond the weight of that question alone. This is representative of the cost of overreliance on AI in the real world: if your colleagues notice you are outsourcing your work to AI without adequate oversight in the real world, it calls into question the reliability of *all* work you deliver, not just the work on which you are caught plagiarizing.

Although you are prohibited from having these tools directly integrated into your workspace or from copying content from these assistants directly into your work, you are nonetheless permitted to use them more generally. The important consideration is to ensure that you are using the AI agent as a learning assistant rather than as a homework assistant: so long as your submission solely reflects your own understanding of the content, you are encouraged to let AI assistants aid in developing your understanding.

Feedback

Every semester, we make changes and tweaks to the course formula. As a result, every semester we try some new things, and some of these things may not work. We ask your patience and support as we figure things out, and in return, we promise that we, too, will be fair and understanding, especially with anything that might impact your grade or performance in the class. Second, we want to consistently get feedback on how we can improve and expand the course for future iterations. You can take advantage of the feedback box on the course forum (especially if you want to gather input from others in the class), give us feedback on the surveys, or contact us directly via private course forum messages.

For other questions, please first check out the [Course FAQ](#).