

CS 7496 Computer Animation Syllabus

Spring, 2026

Delivery: 100% Web-Based, Asynchronous

Dates course will run: Jan 12 – May 7, 2026

Instructor Information

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General Course Information

Description

This course aims to understand the basic principles behind modern kinematic and physics-based animation techniques. This course requires basic knowledge of linear algebra, vector calculus, computer graphics, and object-oriented programming. Python experience is also encouraged since homework materials will be distributed in Python. It focuses on the math and algorithms behind computer animation techniques instead of the practical use of animation tools, such as Maya, Blender, and/or Unity. Course topics include keyframe animation, differential equations, particle dynamics, 3D orientation, rigid body simulation, collision and contact, character animation, inverse kinematics, motion capture, motion control, and reinforcement learning.

Pre- &/or Co-Requisites

Not mandatory, but it is better if you understand:

- Computer Graphics (3451)
- Thorough understanding of linear algebra
- Vector calculus
- Good working knowledge of Python programming

Course Goals and Learning Outcomes

By the end of the course, students will be able to:

1. Practice mathematical concepts and algorithms for kinematics and physics-based animations.
2. Implement interactive animation tools in Python.
3. Describe the pipeline of character animation, from motion capture to inverse kinematics.
4. Outline general concepts of control and learning algorithms.

Course Materials

- No textbook needed – only lecture notes
- Physically Based Modeling: Principles and Practice (Online Siggraph '97 Course notes)
 - <https://www.cs.cmu.edu/~baraff/sigcourse/>

Course Text

N/A

Additional Materials/Resources

N/A

Course Website and Other Classroom Management Tools

- Canvas: Syllabus, lecture slides, additional reading materials, project instructions, grades can all be found on Canvas.
- Ed: Q&A and discussions led by students.

Course Requirements, Assignments & Grading

Assignment Distribution and Grading Scale

Assignment Weight Distribution and Due Dates

Assignment	Release Date	Due Date	Weight (Percentage)
Project 0: Introduction	Jan 12, 2026 (Mon)	Jan 25, 2026 (Sun)	10%
Project 1: Keyframe animation	Jan 26, 2026 (Mon)	Feb 8, 2026 (Sun)	10%
Project 2: Integrators	Feb 9, 2026 (Mon)	Feb 22, 2026 (Sun)	10%
Project 3: Tinker toys	Feb 23, 2026 (Mon)	Mar 8, 2026 (Sun)	10%
Project 4: Rigid body Simulation	Mar 9, 2026 (Mon)	Mar 29, 2026 (Sun)	10%
Project 5: Inverse Kinematics	Mar 30, 2026 (Mon)	Apr 12, 2026 (Sun)	10%
Project 6: Reinforcement Learning	Apr 13, 2026 (Mon)	Apr 26, 2026 (Sun)	5%
Quizzes	Every Mondays	Every Sundays	20%
Midterm Exam	Oct 6, 2025	Oct 12, 2025	5%
Final Exam	Dec 1, 2025	Dec 8, 2025	10%

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%

Description of Graded Components

Programming Projects

Each student will complete six medium-sized programming projects in Python. Each project is sent out to Vocareum in the form of a Jupyter Notebook. The students may talk with one another about any of the concepts required for the programming projects, but each student must perform the actual programming of these assignments on their own. Students must write all the

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code for each assignment themselves without any form of code sharing by electronic, written, verbal, or any other means. Modifying the code found online is not allowed. Pair programming of any kind is not allowed. The only code from others that may be used in these assignments is that which is given by the instructor. Posting your code on any public repository, such as GitHub, is not allowed. Note that it is impossible to get a good grade in this course without completing all six programming assignments.

Quizzes and Exams

At the end of each module, students will be tasked to solve a few quiz questions on Canvas to reiterate their understanding. At the end of the semester, students will also take an exam based on previous lectures and quizzes.

Extra Credit Opportunities **[optional]**

Most projects contain extra credit opportunities, up to 10% per project.

Communication Channels

To maintain effective communication throughout the semester, the course uses three primary platforms with distinct purposes:

Platform	Purpose	Notes
Discord https://discord.gg/TTbtPmbeRs	Informal communication, real-time chat, and community building among students, TAs, and instructors.	Use this for casual discussions, quick questions, sharing relevant resources, or staying connected. A dedicated channel for each project and topic will be available.
Ed Discussion	Formal course-related Q&A, clarifications on assignments, and conceptual discussions.	Post technical or conceptual questions here rather than email. Instructors and TAs will actively monitor and respond. Private posts for personal concerns are also supported.
Canvas	Official course announcements, assignment postings, and grading.	All official notifications and updates will be mirrored on Canvas. Students are expected to check Canvas regularly for announcements and deadlines.

Submitting Assignments

All programming projects must be completed and submitted through Vocareum, which provides the execution environment and autograder feedback. Students must ensure their submissions run correctly on Vocareum before the deadline.

All other assignments (including quizzes, knowledge checks, and exams) must be completed and submitted within Canvas.

Sending any assignment (projects, quizzes, exams, etc.), whether early, on time, or late, directly to the instructor is not permitted and will not be accepted. If there are technical issues, please notify the Help Desk as well as the instructor immediately.

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Assignment Due Dates

All assignments will be due at the times listed above. These times are subject to change, so please check back often. Please convert from Eastern Time to your local time zone using a [Time Zone Converter](#).

Late and Make-up Work Policy

Late policy: 5% reduction per day, calculated for each hour (0.2% deduction). Late submission will remain open for an additional 1 week. No assignment will be accepted seven days or later after the due date.

Grading and Feedback

The projects are hosted on a cloud-based platform called Vocareum. Students are expected to complete and submit their projects through Vocareum, which includes an autograder. Each student will receive feedback that is automatically generated based on their project submission. In addition to the autograder, some parts of the project may also be manually graded by instructors or teaching assistants to assess aspects not covered by the autograder. Each student must ensure that their work runs correctly on Vocareum and passes the autograder by the specified deadline.

Quizzes and exams will also be auto-graded. In special cases or problems, it will be graded within a week by TAs.

Technology Requirements and Skills

Computer Hardware and Software

- High-speed Internet connection
- Laptop or desktop computer with a **minimum** of a 2 GHz processor and 2 GB of RAM
- Windows for PC computers OR Mac iOS for Apple computers.
- Complete Microsoft Office Suite or comparable and ability to use Adobe PDF software (install, download, open and convert)
- Latest versions of Mozilla Firefox, Chrome and/or Safari browsers

Technology Skills

Python programming is required; knowledge on Jupyter Notebook (<https://jupyter.org/>) will also be useful.

Onboarding Quiz and Proctoring Information

All Georgia Tech online degree and certificate students are required to complete the Onboarding Quiz with Honorlock in the first week of the course. Honorlock is utilized for student identity verification and to ensure academic integrity. Honorlock provides student identity verification via facial and ID photos. You may also be asked to scan the room around you. The Onboarding Quiz is needed to help make sure that your identity is verified and that your system is set up to work with Honorlock online proctoring tool. You are required to complete this quiz early in the semester to avoid problems when taking proctored exams.

Technology Help Guidelines

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30-Minute Rule: When you encounter struggles with technology, give yourself 30 minutes to 'figure it out.' If you cannot, then post a message to the discussion board; your peers may have suggestions to assist you. You are also directed to contact the Helpdesk 24/7.

When posting or sending email requesting help with technology issues, whether to the Helpdesk, message board, or me use the following guidelines:

- Include a descriptive title for the subject field that includes 1) the name of course 2) the issue. Do NOT just simply type "Help" into the subject field or leave it blank.
- List the steps or describe the circumstance that preceded the technical issue or error. Include the exact wording of the error message.
- When possible, always include a screenshot(s) demonstrating the technical issue or error message.
- Also include what you have already tried to remedy the issue (rebooting, trying a different browser, etc.).

Course Policies, Expectations & Guidelines

Communication Policy

- Email course questions and personal concerns, including grading questions, via email. Do NOT submit posts of a personal nature to the discussion board unless it is a private post on Ed Discussions.
- Email will be checked at least twice per day Monday through Friday; Saturday and Sunday, email is checked once per day. During the week, I will respond to all emails within 24 hours; on weekends and holidays, allow up to 48 hours. If there are special circumstances that will delay my response, I will make an announcement to the class.
- Student Forum/Q&A discussion boards will be checked twice per day, Monday through Friday; Saturday and Sunday, these discussion boards will be checked once per day.
- The Discord channel will be used as the primary chat channel for students, teaching assistants, and instructors. Virtual office hours will be held using Zoom. I will hold Virtual Office Hours every Monday, 9 AM ET, as well as special office hours for dedicated topics, such as a large, upcoming assignment. Special topic hours will be announced in advance.
- For questions related to technology, the Digital Learning Support team at <https://b.gatech.edu/digitallearningsupport> can provide assistance. You can also reach the Canvas Hotline by phone at 1(877) 259-8498 or by email at support@instructure.com.

Online Student Conduct and (N)etiquette

Although it is not expected to be a problem in a graduate-level class, students are asked to behave in the discussions and other class interactions professionally and civilly. If you are in doubt, do not post it! Instructors reserve the right to remove any postings deemed inappropriate, unprofessional, or otherwise distracting from the course.

University Use of Electronic Email

A university-assigned student e-mail account is the official university means of communication with all students at Georgia Institute of Technology. Students are responsible for all information sent to them via their university-assigned e-mail account. If a student chooses to forward information to their university e-mail account, he or she is responsible for all information, including attachments, sent to any other e-mail account. To stay current with university information, students are expected to check their official university e-mail account and other electronic communications on a frequent and consistent basis. Recognizing that some

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communications may be time-critical, the university recommends that electronic communications be checked minimally twice a week.

Plagiarism & 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. All students enrolled at Georgia Tech, and all its campuses, are to perform their academic work according to standards set by faculty members, departments, schools, and colleges of the university; and cheating and plagiarism constitute fraudulent misrepresentation for which no credit can be given and for which appropriate sanctions are warranted and will be applied. For information on Georgia Tech's Academic Honor Code, please visit <http://www.catalog.gatech.edu/policies/honor-code/>.

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

Collaboration & Group Work

Discussions are allowed for the projects, but students must write their answers independently.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404) 894-2563 or <http://disabilityservices.gatech.edu/>, 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 to set up a time to discuss your learning needs.

Copyright

Among the materials that may be protected by copyright law are the lectures, notes, and other material presented in class or as part of the course. Always assume the materials presented by an instructor are protected by copyright unless the instructor has stated otherwise.

Student-Faculty Expectations Agreement

At Georgia Tech we believe that it is important to strive for an atmosphere of mutual respect, acknowledgment, and responsibility between faculty members and the student body. See <https://catalog.gatech.edu/rules/21/> for an articulation of 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.

Subject to Change Statement

The syllabus and course schedule may be subject to change. Changes will be communicated via Canvas and Ed Discussion. It is the responsibility of students to check email messages and course announcements to stay current in their online courses.

Course Schedule

Week	Week Dates	Module Unlocking (bundle, Mon)	Project Unlocking	Project Due (Sun 23:59 ET)	Quizzes	Notes

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1	Jan 12– Jan 25	M1 (lasts for additional 1 week)	P0		Quiz 1	First day of classes (Mon)
2	Jan 19– Jan 25	M2–M3	P1	P0 due Jan 25	Quiz 2,3	MLK Day (Mon)
3	Jan 26– Feb 1			P1 due Feb 1		
4	Feb 2– Feb 8	M4–M5	P2		Quiz 4,5	
5	Feb 9– Feb 15			P2 due Feb 15		P2 window: Feb 9–Feb 22
6	Feb 16–Feb 22	M6–M7	P3		Quiz 6,7	
7	Feb 23–Mar 1			P3 due Mar 1		P3 window: Feb 23–Mar 8
8	Mar 2– Mar 8	Midterm Mar 5 – Mar 8				
9	Mar 9– Mar 15	M8–M10	P4 (3-week)		Quiz 8, 9, 10	
10	Mar 16–Mar 22					
11	Mar 23–Mar 29			P4 due Mar 29		Spring Break Mar 23–27
12	Mar 30–Apr 5	M11-M12	P5		Quiz 11, 12	P5 window: Mar 30–Apr 12
13	Apr 6– Apr 12			P5 due Apr 12		
14	Apr 13– Apr 19	M13	P6		Quiz 13	P6 window: Apr 13–Apr 26
15	Apr 20– Apr 26			P6 due April 26		

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16	Apr 27– May 3	Final Preparation Week				Final Instruction (Apr 27–28)
	May 1– May 4	Final Exam May 1-May 4	Final Exam opens Thu			Reading Period (Apr 30, May 5)