[AECT 1500] Syllabus

[Creative Coding and Emerging Technologies Lecture/Lab, 3 Credits]

Lecture meets twice weekly for 50 minutes and Lab is three hours per week

This sample syllabus was prepared by Brian Magerko in Fall 2024.

Instructor Information

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

General Course Information

Description

Creating interactive experiences with code covers a broad pallet of technologies, techniques, and materials. This course builds on students' prior introductory programming experiences to provide a platform for understanding the interplay between expression through computer code. It will explore the role of emerging technologies in the creative coding process and present the opportunity for students to deepen their programming knowledge while building multiple computational art portfolio pieces across the semester. The course will be taught across multiple programming languages, emphasizing core computational thinking concepts and providing students with the facility to navigate the ever shifting web of publicly available computing tools, AI models, and platforms.

This course focuses on a survey of different forms of expression in programming, emphasizing breadth over depth in experience. Students will learn the critiquing process and engage in peer critiques and discussion of each others' works.

Pre- &/or Co-Requisites

Students must either take CS 1315 or equivalent prior to taking this course or coincident with this course.

Course Goals and Learning Outcomes

This undergraduate course focuses on students reaching the following learning objectives:

- Students will increase their foundational understanding of seminal artistic computational works.
- Students will learn critical studio making skills, such as presenting one's work for critique and critiquing the work of others.
- Students will learn fundamental computer programming concepts within the context of personal expression and meaning making with programming.
- Students will learn how to incorporate emerging technologies into their artistic practice
- Students will learn basic code and design documentation.
- Students will be engaged in a creative, entrepreneurial mindset where they are given open-ended problems to solve and/or artistic prompts to respond to.
- Students will learn the technical language used to describe computational art.

Course Requirements & Grading

Assignment	Date	Weight (Percentage, points, etc)
Homework 1	Week 2	15%
Homework 2	Week 6	15%
Homework 3	Week 9	15%
Homework 4	Week 13	15%
Homework 5 / Final Project	Week 15	40%

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%

According to policy, grades at Georgia Tech are interpreted as follows:

A	Excellent (4 quality points per credit hour)
B	Good (3 quality points per credit hour)
C	Satisfactory (2 quality points per credit hour)
D	Passing (1 quality point per credit hour)
F	Failure (0 quality points per credit hour)

See the Registrar's breakdown of the grading system for more information.

If this course is taken pass/fail, a C (70% or above) will constitute a passing grade.

Course Materials

Course Texts

This text is used enough in the course that it would be good to have a copy:

The Nature of Code: Simulating Natural Systems with JavaScript by Daniel Shiffman

Excerpts from the following will be available on Canvas:

- **"On the Dangers of Stochastic Parrots" by Emily M. Bender, Timnit Gebru, Angelina McMillan-Major, Shmargaret Shmitchell**
- **"Creativity and Artificial Intelligence" by MA Boden**
- **"How to Critique" from *Discussing Design* by Adam Connor and Aaron Irizarry**
- ***Deep Learning:A Visual Approach* by Andrew Glassner**
- "A survey on the procedural generation of virtual worlds: The Ethics of Creativity: Emerging Challenges" by Jonas Freiknekt and Wolfgang Effelsberg
- *The New Media Reader* by Nick Montfort and Noah Wardrip-Fruin
- **"The Chinese Room Argument" by John Searle**

Course Website and Other Classroom Management Tools

All course information and reading excerpts can be found on Canvas.

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.

Participation, Attendance, and Illness

Active participation is vital to this course. That being said, if you are ill, we ask that you call into class and participate remotely rather than coming to class in-person. If you are ill, and scheduled to present in class, you may choose to present remotely without penalty or swap slots through prearrangement with another student in the class. Absence from class without remote participation will be considered unexcused unless you have a doctor's note, or it is a pre-arranged absence due to religious observance, required GT business, or accompanied by documentation from the Dean of Students' Office. More than three unexcused absences will result in a failing grade in the course.

AI Policy

AI should only be used when explicitly noted in the assignment and should always be cited appropriately and independently fact-checked.

Inclement Weather and Digital Learning Days

If a weather-related event affects campus operations, instructors have the discretion to cancel classes or pivot to digital instruction. Depending on planned class activities, this may result in a digital learning day through teams. During weather or emergency events, students should monitor their email for a class mode announcement and make a reasonable effort to participate in these activities. Students should communicate via email if power outages or other circumstances are preventing participation.

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.

Campus Resources for Students

Undergraduate Student Academic Success Resources:

A list of resources for undergraduate students' academic success and information about advising can be found at Success at Tech.

Student Well-Being:

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)

Course Schedule

	Type	Topic	Assignments
Week 1	Lecture	Code as Art: Obfuscated languages Double coding	HW1 released. Read "Double Coding" in *New Media Reader*.
	Lecture & Discussion	Art as Code: Historical examples: Listening Post, Wooden Mirror, Conway's Game of Life	Canvas blog post of computational art paper due + responses to 2 peers' posts Read Chef programming language manual.
	Lab	Chef assignment	
Week 2	Lecture	2d animation in P5.js • the animation loop • strokes, points, lines, polygons	HW1 due: Chef assignment due (the text of the program)
Week 3	Lecture	2d animation in P5.js • Text • matrix transformations Critiquing	Read: "How to Critique"; HW2 released.
	Lab	Randomness	Read Schiffman Ch. 0
Week 4	In-class critiques	HW1	Students present HW1. Bring Chef programs cooked / baked / mixed.
	Lab	Vectors	Read Schiffman Ch. 1
Week 5	Lecture	User input in P5.js	
	Lecture	Forces	Read Schiffman Ch. 2&3
	Lab	Oscillation	Read Schiffman Ch. 4
Week 6	Lecture	Particle Systems	

	Lecture	Audio in P5.js	HW2 due: P5.js interactive graphics
	Lab	Autonomous Agents	Read Schiffman Ch. 5.
Week 7	In-class critiques	HW2	HW3 released.
	Lab	Physics Libraries	Read Schiffman Ch. 6.
Week 8	Lecture	Cellular Automata	Read Schiffman Ch. 7.
	Lecture	Procedural Generation	Read "A survey on the procedural generation of virtual worlds." by Freiknecht and Effelsburg
	Lab	kaplay.js	
Week 9	Lecture	Arduino Introduction • JS for Arduino / using Johnnyfive • Arduino project basics	(bring Arduino UNO kit to class)
	Lecture	Arduino I/O	
	Lab	Arduino mini-project in class	HW3 due: P5.js ALife ecosystem simulation
Week 10	In-class critiques	HW3	HW4 released
	Lab	Flask App development	
Week 11	Lecture	AI and Creativity	Read Boden.
	Lecture	Anatomy of Neural Networks	Atlas of AI Crawford Video + Glassner Ch 14.
	Lab	Teachable Machine	
Week 12	Lecture	Backpropagation	Read Glassner- Ch-16 CNN + Glassner- Ch-18 Autoencoder
	Lecture	Autoencoders and Latent Spaces	
	Lab	Using huggingface & Llama	
Week 13		Is Deep Learning Creative?	HW4 due: physical computing prototype Read Searle.
		Using LLMs in your Code	HW5 released.
	Lab	Using Langchain	

Week 14	Critiques	HW4	
		HW4	
	Lab		
Week 15	Discussion	Ethics of Generative AI	Read “Stochastic Parrots”
		Ethics of AI in Creativity	Read “The Ethics of AI Creativity: Emerging Challenges”
	Lab	Project work	
Final day of semester			HW5 due: LLM agent