UNIVERSITY OF SAN FRANCISCO
CHANGE THE WORLD FROM HERE

CS 486-686 GenAI in Practice

Spring 2025

CS TR 8:00am - 9:45am 01/21/25 - 05/08/25 LS 307 W 4:45pm - 6:15pm 01/21/25 - 05/07/25 LS 307
Lecture

Instructor Information

Gregory Benson
benson@usfca.edu
Office Hours
Tue/Thu 1:30pm-2:30pm Wed 3:45-4:35
Office Location: HR 412A and Zoom
Additional Information
https://usfca.zoom.us/j/628537645

Heran (Steven) Zhang
hzhang129@dons.usfca.edu
Office Hours
Mon 5pm-7pm, Fri 1:00pm-3:00pm
Office Location: Zoom
Additional Information
https://usfca.zoom.us/j/8236059756

Course Description

Topics not covered by other CS curricular offerings. Students may register for this class in more than one semester. Consent of instructor required. Offered intermittently.

Generative AI and Large Language Models (LLMs) are reshaping software development and influencing countless industries. In this course you will learn practical skills for working with LLMs, covering technologies and tools such as LLM APIs, prompt engineering, data engineering, embeddings, vector databases, multimodal LLMs, LLM agents, and fine-tuning. Python will be the primary language for development and there will be several projects will enable you to get first-hand experience with these technologies. We will

read current writings and research papers covering LLM technologies and there will be a final group project and presentation.

Course Learning Outcomes

On completion of this course you will

- Be able write code that interacts with LLMs to solve a range of problems
- Understand and utilize different prompting techniques
- Understand and utilize embeddings and vector databases for constructing prompt context
- Work with multi-modal LLMs
- Develop LLM agents to autonomously solve problem and interact with external systems
- Fine-tune LLMs for domain-specific problems
- Learn the strengths and weaknesses of several prominent LLMs

Assignments

Labs consist of development environment configuration and programming problems. Labs are design to get you to engage with the material early and help prepare you for the projects. Labs will either be autograded or spot checked by myself or the TA.

Paper Evals we will be reading articles and research papers in this class. In preparation for the class discussions on these articles and papers you will fill out a one-page evaluation form to help you engage with the paper.

Projects are one of the main assessment tools for the course. There will be both individual projects and a final group project. Most projects will be interactively graded and you will be required to demonstrate your project solution and explain how your solution works at the code level. Some projects may have autograder tests. For the final group project you will submit a project paper and presentation. For interactive grading, you must come to an interactive grading meeting to receive credit for the project. Late projects will be subject to a 3% deduction for each late day up to 10 days. After 10 days you can get no more than 50% credit for a project submission.

Grading Breakdown and Grading Policies

Grading Breakdown

1. Attendance: 20%

2. Class Participation: 10%

3. Labs: 10%

4. Paper Evals: 10%

5. Projects: 50%

Course Policies

1. See the attendance policy below.

2. Class participation

    1. You need to actively engage in the class to demonstrate participation. This includes asking questions and contributing to discussions in class, asking and answering questions on Campuswire, and coming to office hours.

3. Clarity and consistent counts in any submitted work such as written work and code.

4. Submitted work

    1. You may get explanatory help from the instructor, TAs, friends, tutors, Internet sites, and generative AI

    2. You can use coding assistants and AI pair programming to formulate your solutions

    3. You should only submit work that you fully understand and can explain

    4. You must not provide your work to other students (giving your solutions can result in a 0)

    5. Group projects are an exception in that you are expect to work together on your code

5. Deadlines

    1. If you are not done with an assignment by the deadline, you should turn in what you have working to get full credit for that work

    2. Labs cannot be submitted late

    3. Late work and corrections may be turned in with a 3% penalty for each late day up to 10 days. After that you can get a maximum of 50% for a project

    4. Extensions for full credit are not given except in extenuating circumstances, which you must discuss with the instructor in advance

6. Letter Grades are assigned according to the following table, without rounding or curving

Grade shown in Canvas	Letter Grade
100.0% - 93.33%	A

Grade shown in Canvas	Letter Grade
< 93.33% - 90.0%	A-
< 90.0% - 86.67%	B+
< 86.67% - 83.33%	B
< 83.33% - 80.0%	B-
< 80.0% - 76.67%	C+
< 76.67% - 73.33%	C (minimum grade for C
< 73.33% - 70.0%	C-
< 70.0% - 66.67%	D+
< 66.67% - 63.33%	D
< 63.33% - 60.0%	D-
< 60.0%	F

Texts and Supplies

OpenRouter.ai API Key (start with $10 and expect no more than $50 total)
Where to purchase (URL): https://openrouter.ai/

Course Schedule

All Dates:

Day	Date	Event	Activities
Tuesday	**1/21/2025**	**First Day of Class**	

Wednesday	1/22/2025		
Thursday	1/23/2025		
Friday	1/24/2025		
Saturday	1/25/2025		
Sunday	1/26/2025		
Monday	1/27/2025		
Tuesday	1/28/2025		
Wednesday	1/29/2025		
Thursday	1/30/2025		
Friday	1/31/2025		
Saturday	2/1/2025		
Sunday	2/2/2025		
Monday	2/3/2025		
Tuesday	2/4/2025		
Wednesday	2/5/2025		
Thursday	2/6/2025		
Friday	2/7/2025		
Saturday	2/8/2025		
Sunday	2/9/2025		
Monday	2/10/2025		
Tuesday	2/11/2025		
Wednesday	2/12/2025		
Thursday	2/13/2025		
Friday	2/14/2025		
Saturday	2/15/2025		
Sunday	2/16/2025		
Monday	2/17/2025	President's Day Holiday (No Class)	
Tuesday	2/18/2025		
Wednesday	2/19/2025		
Thursday	2/20/2025		
Friday	2/21/2025		
Saturday	2/22/2025		
Sunday	2/23/2025		
Monday	2/24/2025		
Tuesday	2/25/2025		
Wednesday	2/26/2025		
Thursday	2/27/2025		

Friday	2/28/2025		
Saturday	3/1/2025		
Sunday	3/2/2025		
Monday	3/3/2025		
Tuesday	3/4/2025		
Wednesday	3/5/2025		
Thursday	3/6/2025		
Friday	3/7/2025		
Saturday	3/8/2025		
Sunday	3/9/2025		
Monday	3/10/2025	Spring Break (No Class)	
Tuesday	3/11/2025	Spring Break (No Class)	
Wednesday	3/12/2025	Spring Break (No Class)	
Thursday	3/13/2025	Spring Break (No Class)	
Friday	3/14/2025	Spring Break (No Class)	
Saturday	3/15/2025		
Sunday	3/16/2025		
Monday	3/17/2025		
Tuesday	3/18/2025		
Wednesday	3/19/2025		
Thursday	3/20/2025		
Friday	3/21/2025		
Saturday	3/22/2025		
Sunday	3/23/2025		
Monday	3/24/2025		
Tuesday	3/25/2025		
Wednesday	3/26/2025		
Thursday	3/27/2025		
Friday	3/28/2025		
Saturday	3/29/2025		
Sunday	3/30/2025		
Monday	3/31/2025		
Tuesday	4/1/2025		
Wednesday	4/2/2025		
Thursday	4/3/2025		
Friday	4/4/2025		
Saturday	4/5/2025		
Sunday	4/6/2025		
Monday	4/7/2025		

Tuesday	**4/8/2025**		
Wednesday	**4/9/2025**		
Thursday	**4/10/2025**		
Friday	**4/11/2025**		
Saturday	**4/12/2025**		
Sunday	**4/13/2025**		
Monday	**4/14/2025**		
Tuesday	**4/15/2025**		
Wednesday	**4/16/2025**		
Thursday	**4/17/2025**	Easter Holiday begins at 4:00 P.M.	
Friday	**4/18/2025**	Easter Holiday (No classes)	
Saturday	**4/19/2025**		
Sunday	**4/20/2025**		
Monday	**4/21/2025**		
Tuesday	**4/22/2025**		
Wednesday	**4/23/2025**		
Thursday	**4/24/2025**		
Friday	**4/25/2025**	Holy Thursday Canceled Classes Meet *	
Saturday	**4/26/2025**		
Sunday	**4/27/2025**		
Monday	**4/28/2025**		
Tuesday	**4/29/2025**		
Wednesday	**4/30/2025**		
Thursday	**5/1/2025**		
Friday	**5/2/2025**		
Saturday	**5/3/2025**		
Sunday	**5/4/2025**		
Monday	**5/5/2025**		
Tuesday	**5/6/2025**		
Wednesday	**5/7/2025**		
Thursday	**5/8/2025**	Last Day of Classes	

Program Learning Outcomes

Theory: explain and analyze standard computer science algorithms and describe and analyze theoretical aspects of various programming languages

Application: apply problem-solving skills to implement medium- and large- scale programs in a variety of programming languages

Systems: describe the interactions between low-level hardware, operating systems, and applications

Project: demonstrate effective communication and organization as part of a team of software developers or researchers collaborating on a large computer program

Attendance Policy

As noted above attendance is worth 20% of your overall grade. You are allowed 5 "banked" days for both excused and unexecuted absences. That is, you can miss up to 5 days without impact on your attendance grade. Your attendance grade will be computed as max(days-you-attend, (number-of-meetings - 5)) / (number-of-meetings - 5).

University Policies

Credit-hour Policy

One unit of credit in lecture, seminar, and discussion work approximates one hour of direct faculty instruction (or 50 minutes plus a break) and a minimum of two hours of out-of-class student work per week through one 15-week semester. For further details, see USF's Credit Hour Policy.

The below resources and additional information can be found in the Student Life Resource Toolkit.

Students with Disabilities

If you are a student with a disability or disabling condition, or if you think you may have a disability, contact USF Student Disability Services (SDS) within the first week of class, or immediately upon onset of disability, to speak with a disability specialist.

If you are determined eligible for reasonable accommodations, please meet with your disability specialist so they can arrange to have your accommodation letter sent to me, and we will discuss your needs for this course. For more information, please visit Student Disability Services, email: sds@usfca.edu, or call (415) 422-2613.

Behavioral Expectations

The University of San Francisco is committed to providing an environment consistent with the academic nature and core values of the institution in which students can participate in learning as a humanizing, social activity rather than a competitive exercise to support the full, integral development of each person and all persons, with the belief that no individual or group may rightfully prosper at the expense of others.

It is important you know what is expected of you academically and behaviorally through the published course syllabus, the Student Conduct Code, and other instructions provided by the instructor. Therefore, you are expected to uphold the following:

- Behave in accordance with the Student Conduct Code and other USF policies
- Refrain from disrupting the ability of fellow students to learn or the instructor's ability to teach. Examples of disruption include:
  - Cell phone or computer use that significantly or repeatedly distracts others
  - Coming to class late, leaving early, or excessively physically relocating oneself in the classroom
  - Speaking frequently without being called on
  - Yelling, cursing, or engaging in aggressive behavior
- When interacting online, communicate in a respectful fashion. This includes, but is not limited to:
  - Refraining from name calling, profanity, or typing in all capital letters
  - Sending multiple emails with one sentence
  - Avoiding rants or discussing non-relevant topics

Open discussion and disagreement are encouraged when done respectfully and in the spirit of academic discourse. There are also a variety of behaviors that, while not against a specific University policy, may create disruption in this course. Students whose behavior is disruptive or who fail to comply with the instructor may be dismissed from the class for the remainder of the class period and may need to meet with the instructor or Dean prior to returning to the next class period. If necessary, referrals may also be made to the Student Conduct process for violations of the Student Conduct Code.

Academic Integrity

As a Jesuit institution committed to Cura Personalis—the care and education of the whole person — USF has an obligation to embody and foster the values of honesty and integrity. All members

of the USF academic community are responsible for maintaining the standards of honesty and integrity. The honor code applies to all students (undergraduate and graduate) in the College of Arts and Sciences, the School of Education, the School of Management, and the School of Nursing and Health Professions. Faculty and students in the School of Law should review their own honor code for policies and procedures. Students enrolled in distance learning (online courses) are subject to these policies as well as supplemental policies set forth by their program. All students should review and familiarize themselves with the honor code, prohibited conduct, and procedures.

Counseling and Psychological Services

Many college students experience mental health struggles. Counseling and Psychological Services (CAPS) is a great source of support for issues such as anxiety, loneliness, struggles with relationships, stress, identity development, racial/cultural concerns, and mild depression. However, CAPS does not prescribe medication and does not have a psychiatrist on staff, so students with more severe mental health concerns will be referred off-campus for treatment.

Counseling and Psychological Services (CAPS) offers remote individual and group teletherapy to students residing within California. Students seeking services are scheduled for a 15-20-minute phone triage to assess immediate risk, identify treatment needs, and provide initial recommendations. These may include a crisis intake session, brief, intermittent individual teletherapy (every 2-3 weeks), single session teletherapy, weekly individual teletherapy via UWill, weekly group therapy, or referrals to off-campus providers. There are no fees for services. To make an appointment, students must call 415.422.6352 or request an appointment via the CAPS. CAPS does not accept walk-in appointments.

If you are concerned about a student and would like someone to follow up, please contact the Dean of Students Office at 415.422.5330. If you know someone who is an immediate risk of harming themselves or others please contact Public Safety at 415.422.2911 in San Francisco, or out of state dial 911, or call the National Suicide & Crisis Lifeline by dialing 988. In addition, CAPS All Hours line can be reached 24/7 by calling 855.531.076. All students are encouraged to check out CAPS and access our extensive online resources, podcasts, mental health apps, videos, self-care strategies, and more.

Title IX

The Title IX Office seeks to stop, remedy, and prevent occurrences of sex and gender-based discrimination, sexual harassment, and sexual violence. The University has a Policy on Nondiscrimination based on Sex and Gender, Sexual Harassment and Sexual Misconduct. If you have experienced any of these behaviors, we encourage you to report the incident. If you report these behaviors to any staff or faculty member, they must notify the USF Title IX Coordinator.

Students who wish to report any sexual misconduct should use the online mandatory reporting form, or contact the Title IX Office directly. Other reporting options are available by visiting the Title IX website. The Title IX Office is located in Lone Mountain Room 145.

As an employee at USF, and your Professor, I am a mandatory reporter, meaning I have to share any instances of sexual harassment or sexual violence shared with me or that become known to me. I will have to share this information, including names and any details known, to the Title IX Office to connect you with resources. If you would like more information about the resources available, you can ask me at any time this semester. You do not need to tell me why you are asking to get help for a friend, another student, or yourself.

Confidential Resources for Reporting Sexual Misconduct

- Students may speak to someone confidentially which will not generate a report to the Title IX Office by contacting Counseling and Psychological Services at (415) 422-6352 during M-F 9-4pm, or speaking to a clergy member in University Ministry at (415) 422-4463.
- If you need to speak to a mental health clinician immediately, please call the CAPS 24/7 All Hours Line at 855-531-0761 (available daily, including weekends and holidays, and accepts international calls), Public Safety (415-422-2911), 911, the Suicide Hotline (dial 988), or go to your nearest emergency room
- For off-campus resources, and local Bay Area organizations, view this webpage.

Learning, Writing, and Speaking Centers

The Learning, Writing, and Speaking Centers (LWSC) at USF provide individualized support to assist students in better understanding course material and to aid them on their path to success. Services are free and include tutoring, collaborative peer support services, academic skills coaching, writing, and speaking support. Services are available in-person and on Zoom.

LWSC staff can be reached Monday through Thursday between 8:00am-8:00pm and Friday between 8:00am-5:00pm at LWSC@usfca.edu or through the chat box on our myUSF webpage or by phone at (415) 422-6713. To make an appointment for subject tutoring, academic skills coaching, the writing center, or the speaking center, students should visit the Student Appointment Dashboard.

Communication

All course communications, like all other USF communications, will be sent to your USF official email address. You are therefore strongly encouraged to monitor that email account.

Gleeson Library

Looking for help with a research paper or project? Set up a consultation with a Librarian or get 24/7 research help online.

Additional USF Resources

USF Food Pantry

The USF Food Pantry is an intermediate, short-term solution for any registered USF student to receive food and toiletry resources. Students are invited to stop by the pantry located on the first floor of Gleeson Library in the Atrium, and take the items that they need. Items are available on a first-come, first-serve basis until our supply is depleted. You will be asked to check-in via QR code before entering the pantry. For more information and the current schedule, visit the USF food pantry website. If you have further questions, please contact the Pantry Coordinator at usfpantry@usfca.edu or 415-422-4099 (during business hours Monday thru Friday from 9:00am - 5:00pm). You can find out about additional food security resources through the USF food insecurity resource page and the CalFresh resources site.