MERCY UNIVERSITY

Mercy University

CISC 3XX - Applied Generative AI and LLM Applications
Spring – 2026
Dobbs Ferry Campus

Course Syllabus

v. 1.0.0

Instructor Information
Contact: Dr. Tianyu Wang, PhD
Office: Room 205, Maher Hall, Dobbs Ferry Campus
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Email: twang4@mercy.edu with Subject line including **CISC3XX** prefix
Office Hour: By Appointment
Zoom Link (DFA session): TBD

Course Type: Blended (DFA: In-Person Session + DLA/DLB: Distance Learning Not Synced)

<u>**Course Description**</u>

This course provides a comprehensive, hands-on introduction to Generative AI technologies and Large Language Model (LLM) applications. Students will explore the practical use of state-of-the-art generative AI tools, develop proficiency in prompt engineering, and learn to build real-world AI applications. The curriculum covers LLM fundamentals, advanced prompting techniques, multimodal generative AI tools (text, image generation), Retrieval-Augmented Generation (RAG) systems, and rapid application prototyping. Students will gain experience with industry-standard open-source tools including Google AI Studio, Copilot CLI, and interface builders like Streamlit/Gradio. Through hands-on labs conducted during class time, students will develop practical skills in prompt design, AI-assisted coding, building simple RAG applications, and creating AI-powered tools. The course emphasizes tool mastery over theoretical depth, using template-based learning to lower barriers while maintaining rigor. Students will learn to critically evaluate AI capabilities, address ethical considerations, and apply responsible AI practices. This application-focused course is designed to prepare students for the rapidly evolving field of generative AI and equip them with immediately applicable skills highly sought after in today's job market.
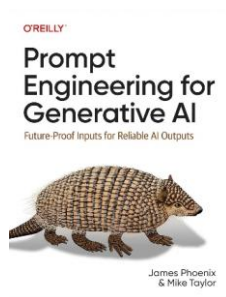
Prerequisites

CISC131/MATH131: Python Programming
CISC231/MATH231: Java Programming
CISC311: Data Structure and Algorithms

Student Learning Outcomes

Upon completion of this course, students will be able to:

- Understand the fundamental concepts and capabilities of Large Language Models (LLMs) and generative AI technologies
- Design and implement effective prompts using advanced techniques including few-shot learning, chain-of-thought reasoning, and role-based prompting
- Apply various generative AI tools (Google AI Studio, ChatGPT, Claude, Gemini) for text generation and problem-solving in practical scenarios
- Utilize AI-assisted coding tools (GitHub Copilot CLI) to accelerate software development and debugging
- Generate images using text-to-image models (Stable Diffusion) and understand multimodal AI applications
- Understand the concepts of vector embeddings, semantic search, and Retrieval-Augmented Generation (RAG)
- Build simple RAG applications and AI-powered tools using provided templates and Google Colab notebooks
- Create interactive AI interfaces using rapid prototyping tools (Gradio, Streamlit)
- Manage AI tools responsibly, including API key security and usage best practices
- Analyze and address ethical considerations including AI bias, fairness, privacy, limitations, and responsible AI usage
- Evaluate the capabilities and limitations of different generative AI models and select appropriate tools for specific tasks
- Demonstrate practical generative AI skills through hands-on labs and a final project

Recommended Textbook (Optional)

Prompt Engineering for Generative AI: Future-Proof Inputs for Reliable AI Outputs

James Phoenix and Mike Taylor

O'Reilly Media, 2024,
ISBN-10 : 109815343X
ISBN-13 : 978-1098153434

MERCY UNIVERSITY

You can also choose to buy a used textbook or eBook.

<u>Software</u>

- Python 3.9+ (https://www.python.org/)
- Google Colab (https://research.google.com/colaboratory/)
- VS Code or PyCharm (https://code.visualstudio.com/)

<u>AI Tools</u>

- Google AI Studio (https://ai.google.dev/aistudio)
- Copilot CLI (https://github.com/features/copilot/cli)
- Google Gemini (https://gemini.google.com/)
- ChatGPT (https://chatgpt.com/)
- Claude Free (https://claude.ai/)
- NotebookLM (https://notebooklm.google/)

Course Outline

Week	Unit	Topic
1	Introduction	LLM, ChatGPT, Google Gemini
2	Prompt Engineering	Basics (ChatGPT, Gemini, Claude, AI Studio)
3		Advanced Techniques (Few-shot, CoT, Templates)
4	Multimodal AI	Napkin AI, Diffusion Models
5	Vibe Coding	Google CLI, GitHub Copilot, Version Control
6		Vibe Coding Workflow
7	Midterm	
8	Vector Databases	ChatGPT, Gemini, NotebookLM
9		Vector Embeddings, RAG
10	AI Agents Advanced	LangChain[1]
11	GUI Design	Streamlit/Gradio
12	Project	Project Design, Teamwork
13	AI Ethics	AI Risk, Safety and Responsible AI
14	Presentation	
15	Final Report	

Course Workload

Students will have 14 weeks to complete this paced course. Each assignment should be completed within the assigned time (usually **due in two weeks** unless specifically announced otherwise).

Labs

- Lab will be posted on the class blackboard.
- Programming Language: **Python 3** + Python Libraries (Open Source)
- Labs designed to be completed during class time.
- Submission: Available electronically ONLY to the **Blackboard**.

Evaluation

To pass this course, students must achieve an average grade of at least 60% on all the different exams and assignments.

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[1]Frameworks are subject to change and will be updated based on current industry trends

Labs	40%
Midterm Exam	30%
Project	30%
Total	100%

Grading and Assessment (Letter grades)

Final grades in the course are assigned based on the following grading scheme.

A	=	93-100	B-	=	80-82	D+ = 67-69
A-	=	90-92	C+	=	77-79	D	= 60-66
B+	=	87-89	C	=	73-76	F	= 59 and below
B	=	83-86	C-	=	70-72	

Format of the Course

This course is structured with two sessions: a lecture session and an in-class lab session. The lecture session will cover the fundamental concepts of Artificial Intelligence (AI) algorithms, including their implementation using Python libraries, and include case studies for further understanding. Students are expected to come prepared for class by reading the assigned materials and conducting additional research. The in-class lab session will provide students with hands-on experience, allowing them to practice implementing AI models using Python libraries, solving problems, and conducting projects. Students will be encouraged to use the provided libraries and online resources to support their learning and future projects.

Distance Learning (DL) students will also have access to both the lecture (recording) and class lab sessions as part of their coursework.

Competencies

Critical Thinking

1. Identify arguments in context and be able to distinguish the premises from the conclusion.
2. Identify factors that make an argument unclear, e.g., ambiguity and vagueness.
3. Analyze data to determine what position or positions the data supports.
4. Recognize unstated, but necessary, assumptions and premises as well as unstated, but implied conclusions.
5. Analyze a complex problem by identifying its components.
6. Choose and defend one course of action among alternatives.

Quantitative Reasoning

1. Apply quantification as a problem-solving strategy to real world situations.

2. Perform arithmetic computations necessary to solve common mathematical problems.
3. Demonstrate computer literacy using software applications.
4. Recognize the reasonableness of numeric answers.

Oral and Written communication

Through their written work as well as their oral participation in class, students are required to exercise their ability to:
1. Organize ideas effectively.
2. Hear, interpret, and evaluate information and accurately respond to instructions.
3. Select and narrow a subject plus clarify a purpose/objective.

<u>**Competencies**</u>

Critical Thinking

1. Identify arguments within a given context and distinguish premises from conclusions
2. Identify factors that may make an argument unclear, such as ambiguity and vagueness
3. Analyze data to determine which positions it supports
4. Identify unstated assumptions and premises, as well as unstated implied conclusions
5. Analyze complex problems by breaking them down into their components
6. Select and defend a course of action from among multiple alternatives

Quantitative Reasoning

1. Use quantification as a problem-solving strategy in real-world situations
2. Perform arithmetic calculations to solve common mathematical problems
3. Demonstrate proficiency in using software applications
4. Evaluate the reasonableness of numerical answers

Oral and Written communication

Throughout the course, students will be required to demonstrate their ability to:
1. Organize ideas effectively through both written work and oral participation in class
2. Listen to, interpret, and evaluate information and accurately follow instructions
3. Select and narrow a subject and clarify a purpose or objective through their written work and oral participation in class

<u>**Attendance Policy**</u>

Students are expected to attend all classes. Absences more than **three (3) classes** may result in an automatic failure or a lower grade. If a student is absent from class, they must provide written documentation (e.g., a medical or legal note) to the instructor. Absences for in-class assignments or tests must also be accompanied by written documentation. Excused absences include

documented illness, deaths in the immediate family, military duty, jury duty, religious holy days, and College activities. Accommodations for these excused absences will be made in a way that does not penalize students. Consideration will also be given to students with dependent children experiencing serious illness. If possible, students should inform the instructor in advance of an absence and submit relevant documentation. Students are responsible for obtaining materials from missed classes by contacting a classmate or the instructor during office hours or other times.

In-class or Online Course Expectations

In-class. Active participation is essential to successful completion of this course. Participation in the class requires, in turn, that students attend class (on campus or, if classes are online, via Blackboard) regularly and prepared. The acceptance and grading of papers submitted late is solely at the discretion of the professor. Computer use in the classroom is limited to note-taking and other purposes directly related to classroom activities; other uses are distracting to other students. Cell phone and smart phone use in the classroom is not permitted. Students who must use their phones in case of emergency are asked to leave the class. Those who use computers or phones contrary to these expectations will be asked to leave the classroom for the duration of the class meeting

Online. If all or part of the course is conducted asynchronously online, it is expected that students post or otherwise complete work within stated deadlines and that this work will count toward attendance. If part or all of the course is conducted synchronously (in real time) online, students are expected to attend with cameras turned on unless an exception is granted by the instructor. Students are also expected to keep audio muted when not speaking so that sound quality is maintained for the class and to minimize distractions. Serious issues with technology access should be discussed with the instructor and PACT mentor.

Course Preparation & Participation
(Instructors may provide additional information here)

Student Expectations/Behavior
(Instructors should include expectations about the use of technology, professionalism, collaboration with peers, mutual respect, or other matters important to the course learning environment, as needed.)

Mercy University Student Code of Conduct
https://www.mercy.edu/media/code-student-conduct

Mercy University Academic Policies

Academic Integrity Policy

Academic integrity is the pursuit of scholarly activity in an honest, truthful and responsible manner. Students are required to be honest and ethical in carrying out all aspects of their academic work and responsibilities.

Dishonest acts in a student's academic pursuits will not be tolerated. Academic dishonesty undermines the University's educational mission as well as the student's personal and intellectual growth. In cases where academic dishonesty is uncovered, the University imposes sanctions that range from failure of an assignment to suspension and expulsion from the University, depending on the severity and recurrence of the case(s).

Examples of academic dishonesty include, but are not limited to, cheating, plagiarism, obtaining unfair advantage, and falsification of records and official documents. Students should familiarize themselves with Mercy's Academic Integrity Policy found here, which also outlines consequences for policy violation, reporting processes and information regarding academic and judicial sanctions.

Mercy University Attendance Policy
Excessive absence interferes with the successful completion of a course of study and diminishes the quality of group interaction in class. To encourage students to accept their obligation to attend class the following policy is established: Class attendance is a matter between the instructor and the student. Instructors are obliged to announce and interpret specific attendance policies to their classes at the beginning of the term and include the policy in the course syllabus. Any student who has been excessively absent from a course and does not present adequate documentation to the instructor and fails to officially withdraw from the course before the last day for course withdrawal may receive the grade of FW (fail-withdrawal), which is computed as an F for GPA purposes.

Lost Class Time Policy
Purpose: This policy addresses lost class time due to an official university or campus closing and other instances in which a faculty member cancels a specific class session when the university is open and operates on a normal schedule. Lost class time is to be made up so that the university is in compliance with Federal and New York State Education Department requirements specifying that the number of contact hours per course credit must be met. This policy also reinforces the university's commitment to providing our students with the depth and quality of education that they expect and deserve and maintaining faculty autonomy with regard to curriculum and teaching.

Missed classes may be rescheduled and/or may result in alternative assignments to achieve the learning goals of the class. Faculty may utilize a variety of options for making up lost class time that include but are not limited to:

1. Online options, including synchronous or asynchronous activities, meeting through Blackboard Collaborate, assignments via Blackboard, and/or the course Blackboard discussion forum;
2. Alternative assignments (including special outside-of-the-classroom experiences, library and field experiences, library and field experiences, group work, the collection and analysis of data, and preparation of reports or other products);
3. Classroom time rescheduled with student input.

Student's Responsibility for Cancelled and Missed Class Sessions
Students are responsible for completing any academic work missed due to lost class time. In the case of a university's cancellation of classes due to weather or other circumstances, students are responsible for making up the class work based on instructions from the faculty member. Unless otherwise indicated by the faculty member, lost class make-up instructions will be included in the course syllabus/outline and posted on Blackboard for the course.

Mercy University Course Withdrawal Policy
https://catalog.mercy.edu/content.php?catoid=20&navoid=1996#withdrawalfromacourse

Additional Support Information

Online Learning
Blackboard, Mercy's learning management system, is fundamental to supporting our course content. On Blackboard, you will find course readings and materials. Please familiarize yourself with the Blackboard website and check it regularly. When we make changes to our course calendar, I will post an updated syllabus on Blackboard.

Libraries
Mercy Libraries provide teaching and learning spaces, information technology, and information resources—and serve students through virtual research assistance, consultations, and information literacy instruction. Information about research assistance and service hours is available on the Mercy Libraries webpage.

Advising – PACT (Personalized Achievement Contract) Program
PACT advisors help Mercy students with the entire college experience, including navigating Mercy's offices, policies, and procedures; advising on academic courses and planning; choosing majors and minors; exploring career options; joining student clubs; understanding financial aid; and more. You can arrange to meet with a PACT advisor via the Student Hub in Mercy Connect or visit the PACT offices in Main Hall at the Dobbs Ferry campus.

Tutoring and Academic Support

The Center for Academic Excellence and Innovation (http://mercy.edu/academics/academic-tutoring) offers academic support to students in writing, math, science, and an extensive range of other subjects. You can make one-on-one appointments here.

Student Wellness

The Health Office oversees evaluation and treatment for common minor injuries and illnesses, preventive health care, health education, and referrals to local specialists or hospitals as needed. The office is staffed by Family Nurse Practitioners and Registered Nurses with appointments available on all three campuses. We are committed to providing confidential, responsive, high quality medical care to our diverse student community. There are no fees for the services in the Student Health Office. To make an appointment at the Health Office, call (914) 674-7255 or email healthoffice@mercy.edu to speak with one of our providers. https://www.mercy.edu/student-support/health-wellness-center

Students with Disabilities – Office of Accessibility

Mercy University is committed to the availability of its academic offerings to all qualified students, in compliance with section 504 of the Rehabilitation Act and the Americans with Disability Act (ADA). The Office of Accessibility Services coordinates disabilities services, including the provision of auxiliary services. Students whose disabilities may require some type of accommodation must self-identify and complete a "Request for Accommodations" agreement. An intake interview with the Director for Disabilities Services may be required. Both the request for accommodation and the interview should be completed one month prior to the academic term. Reasonable accommodation will be made upon receipt of medical documentation of the disability, which supports the request and need for the accommodation. Appropriate modifications of accommodation will be worked out on a case-by-case basis.

Requests for testing with accommodation should be made to the director for Disabilities Services two weeks in advance of need. Students with a disability for which they are or may be requesting

accommodation are encouraged to contact the Office of Accessibility Services, Main Hall, Room 108, 914-674-7523, as soon as possible in the term. More information can be found at: https://www.mercy.edu/student-support/office-accessibility

Student Counseling Services

The Student Counseling Center offers students help with mental health issues including increased stress, depression, and anxiety as well as concerns about their academic progress, daily living, adjustment to college and relationships with others. Our Counselors provide brief treatment lasting up to **eight sessions** per semester. In-person sessions are available Monday – Friday between the hours of 9 AM and 5 PM on all three campuses by appointment. All services

are free, confidential, and provided by licensed therapists for students currently registered in classes. To make an appointment please email us at **counselingcenter@mercy.edu** or call us at **914-888-5150**.

Campus Emergencies

Emergency Evacuation: In the event of an emergency, please proceed calmly and quickly to the nearest emergency exit. Leave personal belongings behind and use stairs instead of elevators to exit the building. In an actual emergency or drill, elevators will automatically be recalled to the lobby and will not respond to call buttons. Individuals with mobility issues should proceed to the nearest fire rated stairwell and await rescue from first response personnel. Ensure that you notify someone that you are in the stairwell and cannot descend without aid.

Emergency Phone Numbers: In case of an on-campus emergency, call the Mercy University Campus Safety Office at 914-674-9999, or x9999 (Dobbs Ferry campus). You may also dial 911.

Non-emergencies: Contact the Mercy University Campus Safety Office at 914-674-7225.