



Course Syllabus: Independent Study in Computer Science  
Department of Computer Science,  
McCoy College of Science, Mathematics & Engineering  
CMPS 4993 Section 201  
Spring 2025 January 21 - May 17, 2025

### **Contact Information**

Instructor: Lopamudra Roychoudhuri  
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Office hours: MWF 12:30-1:30 pm, TR 1:00-2:00 pm  
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Classroom: Faculty office  
Class Times: Will meet once a week – Fri 12:30-1:30 pm

### **Course Description**

This independent study will discuss the principles of a Retrieval-Augmented Generation (RAG) system. RAG systems combine established large language models (LLMs) of generative AI with access to external knowledge bases, thus improving the accuracy and relevance of LLM responses.

First, we will examine various components to process an external knowledge base, such as Extractor and Parser, Splitter, Converter and Storage. Second, we will discuss the design and implementation of a Retriever, which is responsible for efficiently searching and retrieving relevant information, combining the external knowledge base and a popular LLM (for example, ChatGPT) using similarity-based techniques to answer user queries.

As we proceed through the independent study, these principles will be implemented as a RAG-enabled system for Midwestern State University. The objective of the system will be to create a user-friendly interface that will provide relevant information on academic programs, campus services, and policies of MSU, making university knowledge more accessible and navigable for students and faculty.

### **Course Prerequisites**

N/A.

### **Student Learning Objectives**

At the conclusion of this course, students should be able to:

1. Discuss the big picture of LLMs and Generative AI,
2. Understand the concepts behind RAG systems,
3. Enumerate various techniques to process an external knowledge base,
4. Describe a Retrieval system that will combine the external knowledge base and an LLM,
5. Work on a term project, creating a RAG-enabled system for Midwestern State University.

## Textbook & Instructional Materials

Study material: from the Internet.

Software: Many software tools and APIs, such as LangChain, Hugging Face and OpenAI API will be explored.

## Grading

Table 1: Course Grade

Grading Criteria	Dates	Weights	Objectives Assessed
Quizzes	Weekly	20%	1-4
Project	All thru the semester	80%	5

Table 2: Grading Criteria

Grade	Percentage
A	90 or above
B	80 to 89
C	70 to 79
D	60 to 69
F	Less than 60

## General Policies

### Computer Requirements

Taking this class requires you to have access to a computer (with Internet access) to access online course material. Personal computer technical difficulties will not be considered a reason for extra time to submit assignments, tests, or online discussion postings. Computers are available on campus in various areas of the buildings, as well as the Academic Success Center. Contact your instructor immediately upon having computer trouble. If you have technical difficulties in the course, there is also a student helpdesk available to you. The university cannot work directly on student computers due to both liability and resource limitations, however they are able to help you get connected to our online services. For help, log into D2L.

### Desire-to-Learn (D2L)

Extensive use of the MSU D2L program is a part of this course. Each student is expected to be familiar with this program as it provides a primary source of communication regarding assignments, examination materials, and general course information. You can log into [D2L](#) through the MSU Homepage. If you experience difficulties, please contact the technicians listed for the program or contact your instructor.

### Assignment Submission Policy

All assignments, unless otherwise specified, must be submitted to D2L containing the student's name, course name, the title of the assignment, the due date and the date the assignment was turned in. *No e-mail or in-person submission is accepted.*

*No late assignment will be accepted.* There are no exceptions to this rule.

### Attendance Policy

Although student attendance is not calculated into the grade, attendance will be taken each day to track students. **A student missing more than 25% of classes will get an automatic F.**

### Behavior in the classroom

Students are to assist in maintaining a classroom environment that is conducive to learning. This means that the presence of electronic devices other than your laptop are not to be seen, heard, or implied, ever. Questions are encouraged and discussion is acceptable, provided it is pertinent and does not distract from the lesson.

### Policy on Testing Process

The Department of Computer Science has adopted the following policy related to testing.

- All bags, purses, electronics (turned off), books, etc. will be placed in the front of the room during exams, or in an area designated by the instructor.
- Unless otherwise announced by the instructor, nothing is allowed on the desk but pen/pencil/eraser and test papers.
- A student who leaves the room during an exam must turn in the test and will not be allowed to return.

### Academic Misconduct Policy & Procedures

Cheating, collusion, and plagiarism (the act of using source material of other persons or generators, either published or unpublished, without following the accepted techniques of crediting, or the submission for credit of work not the individual's to whom credit is given). The Department of Computer Science has adopted the following policy related to cheating (academic misconduct). The policy will be applied to all instances of cheating on assignments and exams as determined by the instructor of the course. (See below for link to MSU definitions.)

- 1st instance of cheating in a course: The student will be assigned a non-replaceable grade of zero for the assignment, project or exam. *If the final grade in the course, does not result in a one letter grade reduction, the student will receive a one letter grade reduction in course.*
- 2nd instance of cheating in a course: The student will receive a grade of F in course & immediately be removed from course.
- All instances of cheating will be reported to the Department Chair and, in the case of graduate students, to the Department Graduate Coordinator.

See Also: MSU Student Handbook: Appendix E: Academic Misconduct Policy & Procedures  
<https://msutexas.edu/student-life/assets/files/handbook.pdf>.

## **University Policies and Procedures**

### Change of Schedule

A student dropping a course (but not withdrawing from the University) within the first 12 class days of a regular semester is eligible for a 100% refund of applicable tuition and fees. Dates are published in the Schedule of Classes each semester. See Important Dates section below.

### Refund and Repayment Policy

A student who withdraws or is administratively withdrawn from Midwestern State University (MSU) may be eligible to receive a refund for all or a portion of the tuition, fees and room/board charges that were paid to MSU for the semester. HOWEVER, if the student received financial aid (federal/state/institutional grants, loans and/or scholarships), all or a portion of the refund may be returned to the financial aid programs. Two formulas (federal and state) exist in determining the amount of the refund. (Examples of each refund calculation will be made available upon request).

### Student with Disabilities

Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible. Students should present appropriate verification from Disability Support Office during the instructor's office hours. Please note instructors are not allowed to provide classroom accommodations to a student until appropriate verification has been provided. For additional information, contact the Disability Support Office in Clark Student Center 168 - Phone: (940) 397-4140. For more details, please go to [Disability Support Services](#).

### Policy on Concealed Handguns on Campus

Senate Bill 11 passed by the 84th Texas Legislature allows licensed handgun holders to carry concealed handguns on campus, effective August 1, 2016. Please note, open carry of handguns, whether licensed or not, and the carrying of all other firearms, whether open or concealed, are prohibited on campus. Areas excluded from concealed carry are appropriately marked, in accordance with state law. For more information regarding campus carry, please refer to the University's webpage at [MSU Campus Carry Policy](#). If you have questions or concerns, please contact Interim MSU Chief of Police at [steven.callarman@msutexas.edu](mailto:steven.callarman@msutexas.edu).

### Recording of Class Lectures

Permission must be requested in writing and obtained from the instructor before recording of class lectures. If permission is granted, the recording may only be used by the student making the recording. Recordings (or any class materials) may NOT be posted on any internet source without written permission of the instructor. Failure to adhere to the policy may result in removal from the course with a grade of F or other appropriate punishment.

### Midterm Progress Report

In order to help students keep track of their progress toward course objectives, the instructor for this class will provide a Midterm Progress Report for all students in the course. Midterm grades will not be reported on the students' transcript; nor will they be calculated in the cumulative GPA. They simply give students an idea of where they stand at the midpoint of the semester. Students earning below a C at the midway point should a) schedule a meeting with the professor and b) Seek out tutoring.

### Inclement Weather

In the event of a university closure due to bad weather, please check your email and D2L announcement to find out what your assignment will be. I will not conduct an online lecture, but I will most likely expect out-of-class work.

### Important Dates

Visit [MSU important dates](#) from the Registrar's website.

### Grade Appeal Process

Students who wish to appeal a grade should consult the Midwestern State University [Undergraduate Catalog](#).

### Notice

Changes in the course syllabus, procedure, assignments, and schedule may be made at the discretion of the instructor.