



School of Computer Science and Information Systems
44422-01 44622-01 Generative AI for Technologists 3 credit hours
Spring 2026

Instructor: Dr. Ajay Bandi

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Office hrs: M: 10 am – 12 pm & 2 pm – 3 pm; W: 1 pm – 3 pm;

Th: 3:30 pm – 5:30 pm

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Prerequisites: Students must pass CSIS 44460 with a grade of C or better for undergraduate credit, and CSIS 44560 with a grade of C or better for graduate credit.

Textbook and supplementary materials: No textbook is required; all the materials will be posted in Northwest Online.

Course description This course offers an in-depth exploration of Generative AI with a focus on applications for technologists relevant to software development, data analytics, and cybersecurity, etc. It covers essential architecture models like Variational Autoencoders (VAEs), Generative Adversarial Networks (GANs), transformers, and Large Language Models (LLMs). Students will gain practical experience in developing AI-based chatbots, leveraging tools such as graph databases and vector databases for retrieval-augmented generation. The course also emphasizes prompt engineering, security risks, privacy concerns, and ethical considerations, with a final project that allows students to apply these skills in real-world applications.

Student learning outcomes:

1. Define and explain the fundamental principles of Generative AI, including its workings, input/output formats, and diverse applications.
2. Identify and differentiate between key Generative AI models, such as VAEs, Transformers, GANs, and LLMs, understanding their architectures and use cases.
3. Utilize OpenAI models like ChatGPT to create functional applications and gain insights into the evolving landscape of large language models.
4. Design and develop AI-based chatbots, implementing tools like Neo4j for graph databases, and incorporate Retrieval-Augmented Generation (RAG) with vector databases to enhance chatbot responses.
5. Apply prompt engineering techniques to craft effective prompts, assess their performance, and understand the ethical implications associated with prompt-based interactions.
6. Analyze and address security and privacy risks in Generative AI, evaluating regulations, compliance, and best practices for data validation and privacy protection.
7. Complete a final project that demonstrates the ability to build a Generative AI-driven solution, showcasing the application of theoretical knowledge and practical skills acquired in the course.

Assessment methods: Scores on class participation, discussions, paper, final project, and exams

Instructional methods: Instructional methods include lectures, practical demonstration, classroom practice, class projects, and interactive question and answer sessions.

Refer to Syllabus Addendum for additional information

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Graded course requirements:

Grading Component	Points for Undergraduate Credit	Points for Graduate Credit
Assignments/Threaded discussions	150	150
Exams	200	200
Paper	Not Applicable	100
Final Project	100	100
Miscellaneous	25	25
Total	475	575

Final Exam: The class will meet during the final exam time as specified by the registrar's office at <https://www.nwmissouri.edu/registrar/finals.htm>

Grading scale:

For all the students	
Percent Range	Grade
90 - 100%	A
>= 80% and < 90%	B
>= 70% and < 80%	C
>= 60% and < 70%	D
below 60%	F

Course outline/major topics studied:

1. Introduction to Generative AI
 - Define Generative AI

Refer to Syllabus Addendum for additional information

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- Explain how Generative AI works.
 - Describe Generative AI input and output formats.
 - Explore Generative AI Applications
2. Generative AI Models and Architectures
 - Variational Autoencoders (VAEs)
 - Transformers
 - Generative Adversarial Networks (GANs)
 - Large Language Models (LLMs)
 3. ChatGPT and OpenAI Models
 4. AI-based Chatbots
 - Tools for creating AI-based chatbots.
 - Graph Database (Neo4j)
 - Practical implementation of chatbots
 - Vector Database and Retrieval Augmented Generation (RAG)
 5. Prompt Engineering with Generative AI
 - Creating effective prompts
 - Evaluating prompt performance
 - Ethical considerations
 - Best practices for using prompts.
 6. Security Risks and Privacy Concerns using Generative AI
 - Data validation and privacy concerns
 - Remediations for security and privacy concerns
 - Regulations and compliance in Generative AI
 7. Final project

Note: Course schedule is subject to change with instructor notification and students will be responsible for abiding by these changes.

Attendance: Students are expected to attend all classes as specified in the course syllabi for each course. See the attendance policy below. It is the responsibility of the student to promptly notify their instructor when unable to attend class. Please refer to the university policy on attendance at <https://www.nwmissouri.edu/policies/academics/Attendance.pdf>

Late Submission Policy for assignments: Each assigned, graded activity will have a due date posted and is expected to be completed by the due date. All the submissions must be submitted through Northwest Online. Students with incorrect or no submissions will receive zero credit.

Attendance policy: Some in-class exercises may have points associated with them and may not be announced in advance. A student who misses such an exercise due to an unexcused absence will not be allowed to make it up and will receive a zero. Excused absences include attendance at a university sponsored event (documented with an excuse signed by the university sponsor prior to the event) or by circumstances considered adequately extenuating by the course instructor. It is the responsibility of the student to promptly notify his or her instructor when unable to attend class.

The following excused absences are acceptable only:

1. Attendance at a university-sponsored event (Official documentation with an excuse signed by the university sponsor prior to the event).
2. Emergency health reason (illness and injury; Official local medical documentation with a valid reason statement and Official local doctor's notes).
3. Immediate family emergency case by circumstances considered adequately extenuating by the course instructor (serious illness, injury, or death; Official documentation with a valid reason statement and proof).

Academic Calendar: <http://www.nwmissouri.edu/academics/calendar.htm>

Final Exam Schedule: <http://www.nwmissouri.edu/registrar/finals.htm>

Exam, Quizzes and In-class Activities policies: Dates for all quizzes, in class activities, and exams will appear on the course website under the weekly modules. If you must miss an exam, it is your responsibility to notify the instructor prior to the exam.

Make-ups for written quizzes, in class activities, and exams will be given only for valid and verifiable reasons.

Valid reasons include emergency health reason, immediate family emergencies, and university-sponsored trips (same as Attendance policy). Written documentation with suitable verification must be supplied before a makeup will be allowed.

All exams are closed book, closed notes, unless explicitly noted in writing by the instructor.

No calculators, cell phones, or other electronic devices can be used during exams or quizzes unless explicitly allowed by the instructor.

Cheating: Academic dishonesty will not be tolerated in this class. Any form of cheating will be dealt with according to the Academic Honesty Policy provided in the Northwest Missouri State University's Planner/Handbook, and may result in significant penalties, including receiving an F or zero grade for an assignment or exam, an F-grade in the course, and even removal from the program or suspension/dismissal from the University. Do your own work.

Personal Equipment and Software: You will be required to use a computer to complete the assignments or exams for this course. Essential requirements are a modern operating system (Windows, Mac, or Linux) that meets the assignments and exam requirements. It is the student's responsibility to make his/her computer system meet the requirements of the assignments or exam. Each student has one chance per semester to request an extension due to these technical issues, requiring a written explanation along with screenshot, error logs, or other evidence that clearly shows the issue along with the specific date and time. As a computer science graduate student, you must develop the ability to troubleshoot common software configuration issues using a search engine, online tutorials, web forums, and other common tools.

OpenAI API Key Policy: This course involves hands-on assignments that require access to the OpenAI API. Each student is responsible for obtaining their own API key for use in class projects. Students may purchase their API key at their own cost. Instructions for obtaining and using the key will be provided during the first week of class.

Course Communication: Vital course materials, such as instructions, announcements, and assignments, will be available on the course website and your Northwest Missouri State University email account. It is your responsibility to check each of these sources daily.

Professionalism and email: Students are expected to behave in a professional manner in their dealings with each other, the class assistant, and the instructor. Emails should be politely written, use proper grammar, and follow the rules of capitalization.

Emails **must** include the course number (44-622) and section number (01) in the subject line. For example: '[44622-01] Query about Assignment 2'. For security reasons, emails that do not include an appropriate entry for the subject will be ignored. Emailed queries on material found in the Canvas course areas will NOT be answered.

Final exams: If an emergency occurs that prevents the administration of a course scheduled final examination, the final course grades will be calculated based on the work in the course completed to that point in time and the faculty member's considered judgment. Final exams will not be rescheduled, and a grade of "I" will not be given as a result of an institutional cancellation of a final examination. This final exam policy does not apply to online courses.

Artificial Intelligence Engines: Generative AI engines, such as ChatGPT, are fast becoming important tools to help improve various personal, professional, and educational tasks. Specifically for this course, the submission of academic work created by a generative AI engine is not allowed. All submitted course work must be your own work. The goal is for you to learn and understand the course content. AI engines are a tool which can help facilitate the learning process. The understanding of course content is assessed by completing the required course work. Your understanding cannot be gauged if AI generated material is used.

Disclaimer: Course schedule is subject to change, and you will be responsible for abiding by any such changes. Your instructor will notify you of any changes.