MIDWAY UNIVERSITY

CSE 420 – Emerging Technologies Spring 2025 Syllabus

School of Business, Equine and Sport Studies

Part 1: Course Information

CSE 420 - Emerging Technologies
TRD01, Spring 2025 (1/8/2025 - 5/1/2025), 3 credit hours
Little Memorial Library LLIB 108

Course Description

This course is designed to present students with new technologies that are gaining importance. The topics of this course can change over the course offerings. This course, with a different topic, may be repeated.

Instructor Information

Instructor: Xinxing Wu, Ph.D.
Office: Starks 215D
Office Telephone: 859-846-4421 (office)
Email: xinxing.wu@midway.edu (best way to reach me)
Office Hours: M/W/F 11:50 AM – 12:50 PM, 1:50 PM – 2:50 PM;
T/TH 12:00 PM – 2:50 PM

Textbook & Course Materials

Required Text

- **No mandatory textbook.** We will support our learning environment with weekly readings/learnings/labs/projects/challenges that will be posted in Canvas.

Course Requirements

- Internet connection (DSL, LAN, or cable connection desirable)
- Access to Canvas, Teams, other (See Part 6 for more information on accessing tools and technical requirements)

Course Structure

This course is designed to provide students with the opportunity to model problems, propose solutions, and build those solutions through both individual and team-based work. It will span 16 weeks and will focus on equipping students with foundational and practical skills in cutting-edge AI technologies, such as Hugging Face Transformers for NLP, FastAPI for API development, PydanticAI for data validation, and A-Frame for immersive VR interfaces. Students will work on labs and projects that cover real-world applications of these tools, including text classification, summarization, chatbot development, API deployment, and VR integration. The course culminates in a comprehensive project that integrates AI models with interactive systems. Regular attendance

is crucial for success, as the course is structured to build upon previously learned concepts each week.

Online Resources

The course will use several tools/resources to help facilitate learning. Access to some of these tools/ resources will be provided as part of the course materials. Tools/resources include

- Projects-related tool - GitHub https://github.com/
  There are projects on GitHub that are provided by programmers all over the world. Choosing interesting projects for practice is helpful in improving the practical ability of project development.
- CSS https://www.w3schools.com/css/default.asp
- HTML https://www.w3schools.com/html/default.asp
- JavaScript https://www.w3schools.com/js/default.asp
- MySQL https://dev.mysql.com/downloads/installer/
- Git https://git-scm.com/downloads
- Jupyterlab https://jupyter.org/install
- Anaconda or Miniconda https://docs.anaconda.com/anaconda/install/
- FastAPI https://fastapi.tiangolo.com/#typer-the-fastapi-of-clis
- PydanticAI https://ai.pydantic.dev/install/

Part 2: Student Learning Outcomes

Student Learning Outcomes	Course Learning Outcome	Evaluation(s)	PLO Alignment
Demonstrate foundational understanding of Hugging Face Transformers for real-world tasks.	Build and fine-tune transformer models for practical NLP applications using Hugging Face library.	Lab, Project	Demonstrate knowledge of emerging technologies and their application in solving real-world problems.
Develop and deploy APIs using FastAPI to serve AI models.	Implement APIs that expose Hugging Face Transformer models for NLP tasks.	Lab, Project	Apply software engineering practices to create robust AI-based systems.
Apply PydanticAI to validate inputs and outputs for AI applications.	Integrate PydanticAI for validating structured data in FastAPI-based APIs for NLP applications.	Lab, Project	Ensure data integrity and reliability in AI-powered systems.
*Create interactive VR environments using A-Frame to present AI outputs in an immersive manner.	Design and implement VR interfaces that display AI-generated content interactively.	Lab, Project	Integrate cutting-edge tools to develop innovative solutions and user experiences.

* If we have enough time, then we will cover this topic.

MIDWAY UNIVERSITY

Part 3: Topic Outline/Schedule

Week	Topic	Chapters	Lab/Activity	Due Dates
1	Introduction to Language Models	See *Canvas Modules*		
2	Introduction to Transformers	See *Canvas Modules*		
3	BERT	See *Canvas Modules*		
4	Hugging Face	See *Canvas Modules*		
5	Tasks Using the Hugging Face Library	See *Canvas Modules*		
6	Fine-Tuning Pretrained Models (a)	See *Canvas Modules*	**Lab 1**: Sentiment Analysis using BERT.	
7	Fine-Tuning Pretrained Models (b)	See *Canvas Modules*	**Lab 2**: Text Summarization with models like BART or T5.	
8	Fine-Tuning Pretrained Models (c)	See *Canvas Modules*	**Lab 3**: Chatbot development using DialoGPT or GPT-2.	
9	Introduction to FastAPI	See *Canvas Modules*		
10	Setting up endpoints to interact with models	See *Canvas Modules*		
11	Accept and process inputs via API requests.	See *Canvas Modules*		
12	Return predictions from a Hugging Face model through an API, and error handling	See *Canvas Modules*	**Lab 4**: Deploy a Hugging Face model using FastAPI **Project 1**	
13	PydanticAI for AI-specific validation	See *Canvas Modules*		
14	Defining models and managing different outputs from Hugging Face models	See *Canvas Modules*	**Lab 5**: Add PydanticAI validation to a FastAPI app for structured and validated data exchange. **Project 2**	

15	Introduction to A-Frame	See *Canvas Modules*		
16	Creating VR interfaces	See *Canvas Modules*	**Lab 6**: Build a VR interface that presents the output of AI models (e.g., displaying sentiment analysis results or generating storylines in VR). **Project 3 (Final Project)**	
	Final presentation/Final project		**8:00 A.M – 10:00 AM, April 29, 2025.**	

Part 4: Course Grades

Graded Course Activities

See Midway Catalog for more information on Midway University grading scale.

Activity	Value (pts)
Attendance	20
Labs	50
Projects	30
Challenges/Extra tasks	0~20

Please also see Canvas.

Viewing Grades in Canvas

Points you receive for graded activities will be posted to the Canvas Gradebook. Click on the Grades link on the left navigation to view your points. Grades will be posted weekly, typically 5 days following the completion of an activity.

Letter Grade Assignment

Final grades assigned for this course will be based on the total points earned and are assigned as follows:

Letter Grade	Percentage/Points
A	≥ 90
B	80 – 89
C	70 – 79
D	60 – 69
F	Below 60

Final Exams
Students are required to take the Final presentation/Final project at **8:00 A.M – 10:00 AM, April 29, 2025.**

Important Note: For more information about grading at Midway University, visit the academic policies in the University catalog.

Part 5: Course Policies

Regular attendance and participation are expected. If more than 2 unexcused absences occur, a reduction in the final course grade of one point per instance will be assessed. If a student is late twice, that will count as 1 unexcused absence. Attendance is taken at the beginning of class.
If you are unable to attend a class, you are responsible for:

1. Notifying the professor prior to missing class by email.
2. Finding out what was covered in class and what announcements were made.
3. Obtaining handouts and turning in assignments, even if you are unable to attend.

In order to receive an excused absence, you must provide an explanation for your absence that is accepted by the professor or an approved excuse by the Registrar's Office.

COVID Policies

University policies regarding COVID 19 may be found at https://www.midway.edu/our-path-forward/

Attend Class

See Midway Catalog for official statement on class attendance. Students are expected to attend all classes unless excused in advance of the class. Class attendance score will be kept in Canvas and count as 10% of the course grade.

First Week Academic Census Policy

Students must be present in the class and engage in an academically related activity before the end of the first week of classes to show their intent to remain enrolled in the course. Students who do not come to class and/or complete this activity may be dropped from the class.

Late Work Policy

Late work is not accepted without instructor approval in advance. Be sure to pay close attention to deadlines—there will be no make-up assignments or quizzes.

Academic Accommodations

The Accommodations Coordinator in Student Affairs coordinates Midway University's disability support services in compliance with Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990, as amended. When appropriate, Midway University provides reasonable accommodations designed to enable students to equitably participate in and benefit

from Midway University's programs, services, and activities, provided that such accommodations would not:

- fundamentally alter the nature or operation of the University's programs, services, or activities,
- cause undue hardship to the University, or
- pose a direct threat to the health or safety of others.

Obtaining Accommodations

The Accommodations Coordinator works to provide accommodations for students through a confidential and supportive process. Students should be aware that accommodations are not retroactive. Every reasonable effort will be made to provide the appropriate reasonable accommodations, but certain accommodations may take time to coordinate. More information regarding disability support services can be found on the Midway University Disability Support Services webpage.

Students seeking disability support services should initiate the process by contacting the Accommodations Coordinator. Because each person's situation is unique, this initial conversation will determine the direction that the process will take. The Accommodations Coordinator will talk to the student about documentation during the initial conversation. Students should provide documentation from a qualified, licensed professional appropriate to the nature of the disability and requested accommodations. View the Request for Accommodations Form.

Records created by schools that the student has attended previously may also be helpful to the process of determining appropriate accommodations, including documents that reflect education and accommodation history, such as Individual Education Program (IEP), Summary of Performance (SOP), and teacher observations. These documents do not replace the need for documentation listed below but serve as an aid to create a success plan with the student.

After talking with the student, reviewing documentation that has been submitted, and consulting with faculty and staff members as necessary, the Accommodations Coordinator will identify reasonable accommodations. These accommodations and the supporting documentation are subject to regular review and modification. Appropriate faculty or staff members will be notified of established accommodations upon the request of the student to whom they apply. Information regarding a student's specific diagnosis will only be shared with a faculty or staff member on a "need to know" basis, usually as it pertains to arranging accommodations. Requests for faculty notification must be made by the student each term (semester or module) by contacting the Accommodations Coordinator and identifying the individuals to whom the notification of accommodations should be sent.

Academic Honesty & Procedures in Cases of Academic Dishonesty

See Midway Catalog for official policy for academic honesty.

For This Class

In this course, cases of academic dishonesty will result in a zero grade for the assignment, quiz, or exam. Subsequent cases will result in failure of the course

Proctoring

Midway University requires that proctored online tests must be conducted using Xproctor. It is important to note, when students use Xproctor, they must use the Firefox web browser. See https://midway.libguides.com/informationtechnology/onlinelearning for more information. Students in online courses are required to show a photo ID in XProctor at the beginning of each course.

Midway University uses Turnitin plagiarism checker. Students can find out more about Turnitin in here: https://midway.libguides.com/informationtechnology/plagiarismchecker

Grammarly

To access Grammarly, please see http://www.grammarly.com/edu/students. You will use your Midway credentials to log in.

Grammarly analyzes your text and makes context-specific suggestions to help with grammar, spelling and usage, wordiness, style, and punctuation. Grammarly for Microsoft Office allows you to use Grammarly while you're writing Word documents or Outlook emails on Windows. You can also use the Grammarly Plagiarism Checker.

Protocol for Students with Complaints

The University Complaint process may be viewed here.

If the student has a problem or complaint concerning this course should contact the instructor first. If this does not resolve the problem or complaint, then the following protocol should be followed:

Instructor → Department Chair → Dean → Vice President for Academic Affairs

Notice of mandatory reporting of sexual assault, sexual harassment, interpersonal violence, and stalking

As a faculty member, I am designated as a "Mandated Reporter" and must report all disclosures of sexual assault, sexual harassment, interpersonal violence, and stalking to Midway University's Title IX Coordinator per University Policy. If you wish to speak with someone confidentially, please contact Midway's confidential counselor, Dr. DeArth at (859) 846-5745 or gdearth@midway.edu. You may also seek assistance or support measures from Midway's Title IX Coordinator by calling 859-846-5321, or emailing jryan@midway.edu.

Copyright Statement

Please see student handbook for policies regarding copyright.

Syllabus Change Policy

The instructor views the course syllabus as an educational contract between the instructor and students. Every effort will be made to avoid changing the course schedule, but the possibility exists that unforeseen events will make syllabus changes necessary. The instructor reserves the right to make changes to the syllabus as deemed necessary. Students will be notified in a timely manner of any syllabus changes face-to-face, via email or in the course site Announcements.

Part 6: Technical Information & Support Resources

Some assignments and course interactions will utilize Canvas learning management system and/or other internet technologies. All course grades will be posted in Midway Canvas.

Accessing Course Website

Midway University uses Canvas for their learning management system. This course will use Canvas for the facilitation of communications between faculty and students, access to syllabus, submission of assignments, and posting of grades. The Midway Canvas course site can be accessed using this link: https://midway.instructure.com/

You can also download the Canvas app and access through your device:
Canvas Student on the App Store (iOS)
Canvas Student – Apps on Google Play (Android)

If you need help with Canvas, please visit our Canvas help website. Canvas Tier 1 support is available to the Midway Community. You have access to this service 24 hours a day, 7 days a week:

Canvas Support Hotline: 855-411-0376
Live Chat: Canvas Student Support

If you need further assistance with Canvas, please contact help@midway.edu.

Midway Teams

Midway University uses Microsoft Teams to support instruction through chat, web-conferencing, and file sharing. For more information on Microsoft Teams, see Online Resources for Students on the IT help website

Computer Requirements

This course requires that you have access to a computer that can access the internet. Please refer to the technical requirements links on the Canvas homepage for exact specifications or you can access technical requirements on the IT website.

Midway Email

All official Midway university correspondence must be conducted through your Midway email. All instructor correspondence will be sent to your Midway e-mail account. Please plan on checking your Midway email account regularly for course-related messages.

Technical Support Contact Information

Contact the IT Help desk (help@midway.edu) for technical support for email, MyMidway, online classes, and password help.