

Advanced Biomedical Artificial Intelligence

BME 6938

Class Periods: Tuesdays 1:55 PM-2:45 PM (Period 7) and Thursdays 1:55 PM-3:50 PM (Periods 7-8)

Location: BLK 0315

Academic Term: Spring 2027

Instructor:

Dr. Parisa Rashidi

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(352)-392-9469

Office Hours: By appointment on Zoom

Course Description

(3 credit hours) Examines current research in biomedical artificial intelligence for graduate students who have completed an introductory machine learning or deep learning course. Topics may include modern large language models, representation learning, foundation models for biomedical data, multimodal models, agentic and generative AI, and the evaluation, trustworthiness, and deployment of AI in biomedicine. The course combines lectures, student-led paper sessions, and a term project.

Course Pre-Requisites / Co-Requisites

BME 6938 Medical Artificial Intelligence (Fundamentals of Biomedical AI) or an equivalent machine learning or deep learning course, and proficiency in Python.

Course Objectives

- Explain the principles behind current model architectures and training paradigms used in biomedical AI.
- Critically read, present, and critique current biomedical AI research papers.
- Formulate a problem in biomedical AI and select appropriate data, models, and methods to address it.
- Evaluate biomedical AI models rigorously, beyond aggregate accuracy.
- Identify the requirements for translating AI models into biomedical and clinical use.
- Design, carry out, and report a research project in biomedical AI.

Course Format

Lectures: Instructor-led sessions on the core concepts of each topic.

Paper sessions: Student-led presentation, critique, and discussion of assigned research papers.

Reading responses: Short written responses to the assigned papers.

Session formats, assignments, rubrics, and due dates are provided on Canvas and the course website and may be adjusted during the term.

Term Project

Students complete a term project on a problem in biomedical AI and report it in written form and as a presentation. Project guidelines, milestones, and grading criteria are provided on Canvas and the course website.

Materials and Supply Fees

N/A

Required Textbooks and Software

- No required textbook
- Assigned papers and lecture slides will be provided

- Software: Python and open-source machine learning libraries
- A laptop is required

Recommended Materials

- [DL] Deep Learning, MIT Press, Ian Goodfellow, Yoshua Bengio, Aaron Courville.
- [UDL] Understanding Deep Learning, MIT Press, Simon J.D. Prince.
- Stanford CS231n: Deep Learning for Computer Vision. <http://cs231n.stanford.edu/>
- Stanford CS224N: Natural Language Processing with Deep Learning. <http://cs224n.stanford.edu/>

Required Computer

Recommended Computer Specifications: <https://it.ufl.edu/get-help/student-computer-recommendations/>
 HWCoe Computer Requirements: <https://www.eng.ufl.edu/students/advising/fall-semester-checklist/computer-requirements/>

Course Schedule (tentative, subject to change)

Week 1: Course Introduction
 Weeks 2-3: Transformer Review
 Weeks 4-5: Inside Modern LLMs: Architectures, Post-Training, and Reasoning
 Weeks 6-8: Foundation Models for Biomedical Data
 Week 9: Retrieval, Tool Use, and Agentic Systems
 Week 10: Spring Break
 Weeks 11-13: Generative Models, Evaluation, Trustworthiness, and Deployment
 Weeks 14-15: Project Presentations

Important Dates

March 13-20 Spring Break (no classes)
 April 21 Last day of classes
 Assignment and project due dates are posted on Canvas.

Attendance Policy, Class Expectations, and Make-Up Policy

Attendance:

- Required
- Attend office hours if having questions
- Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

Expectations:

- Read the assigned papers before each paper session.
- Write your own code and text. Do not copy from others (plagiarism will be checked).
- Contribute equally to group work.

- Ask for help if you need it (office hours are available by appointment on Zoom).

Late Policy:

- For late submissions, (number of late days * 5%) will be deducted from the assignment grade, unless stated otherwise in the assignment.

Use of AI Tools:

- This course studies AI, and students may use AI assistants (for example chatbots and coding assistants) to understand papers and concepts, to get help with code, and to edit their own writing. Students are responsible for every claim, citation, and line of code they submit, and must verify them. Reading responses and paper critiques must reflect the student's own reading and judgment; submitting AI-generated text as one's own work in these assignments violates the UF Student Honor Code. Project papers must include a short statement describing how AI tools were used. Patient data and credentialed datasets (for example MIMIC) must never be entered into online AI services; use locally run models on approved computing such as HiPerGator.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Paper presentations and critiques	400	40%
Reading responses and participation	200	20%
Term project	400	40%
	1000	100%

Grading Policy

Percent	Grade	Grade Points
94.0 - 100	A	4.00
90.0 - 93.9	A-	3.67
87.0 - 89.9	B+	3.33
84.0 - 86.9	B	3.00
80.0 - 83.9	B-	2.67
77.0 - 79.9	C+	2.33
74.0 - 76.9	C	2.00
70.0 - 73.9	C-	1.67
67.0 - 69.9	D+	1.33
64.0 - 66.9	D	1.00
61.0 - 63.9	D-	0.67
0 - 60.9	E	0.00

Academic Policies & Resources

To support consistent and accessible communication of university-wide student resources, instructors must include this link to academic policies and campus resources: <https://go.ufl.edu/syllabuspolices>. Instructor-specific guidelines for courses must accommodate these policies.

Commitment to a Positive Learning Environment

The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University's core values.

If you feel like your performance in class is being impacted, please contact your instructor or any of the following:

- Your academic advisor or Graduate Coordinator
- HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
- Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@ufl.edu