HCIP-6070 Special Topics: AI in Healthcare (DSBA 6010/IT IS 6010/8010) Fall 2025

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Introduction

This syllabus contains the policies and expectations I have established for the special topics course: AI in Healthcare. Please read the entire syllabus carefully before continuing in this course. These policies and expectations are intended to create a productive learning atmosphere for all students. Unless you are prepared to abide by these policies and expectations, you risk losing the opportunity to participate further in the course.

The standards and requirements set forth in this syllabus may be modified at any time by the course instructor. Notice of such changes will be by announcement in class and by changes to this syllabus posted on the course site on Canvas.

Mutual respect in class

- I will conduct this class in an atmosphere of mutual respect. I encourage your active participation in class discussions. Each of us may have strongly differing opinions on the various topics of class discussions. The conflict of ideas is encouraged and welcome. The orderly questioning of the ideas of others, including mine, is similarly welcome. However, I will exercise my responsibility to manage the discussions so that ideas and argument can proceed in an orderly fashion. You should expect that if your conduct during class discussions seriously disrupts the atmosphere of mutual respect I expect in this class, you will not be permitted to participate further.
- All students and the instructor are expected to engage with each other respectfully. Unwelcome conduct directed toward another person based upon that person's actual or perceived race, actual or perceived gender, color, religion, age, national origin, ethnicity, disability, or veteran status, or for any other reason, may constitute a violation of University Policy 406, The Code of Student Responsibility. Any student suspected of engaging in such conduct will be referred to the Office of Student Conduct.

Permission for recording in class

- Electronic video, image capture, and/or audio recording is not permitted during class, whether conducted in person or online, unless the student obtains permission from the instructor. If permission is granted, any distribution of the recording is prohibited. Students with specific electronic recording accommodations authorized by the Office of Disability Services do not require instructor permission; however, the instructor must be notified of any such accommodation prior to recording. Any distribution of such recordings is prohibited.

Course Description

Artificial Intelligence (AI) has played an important role in improving the quality and efficiency of healthcare. Especially in recent years, with the dramatic increase of the volume and richness of healthcare data and the advent of machine learning and deep learning methods, numerous AI models and applications have been reported to achieve near expert performance or even surpass expert performance in some scenarios. However, successful deployment of AI applications in real-world clinical practice is still rare, broad acceptance of these new technologies is even more challenging. In this course, we will first quickly review major AI models and methods that have been developed in the healthcare domain and then spend most of our time examining the many critical aspects of investigations that are necessary to translate AI models and methods that have been successfully tested in the laboratory settings into real world healthcare settings. (Spring, 3 credit hours)

Pre-requisites

Registered as a HIA Cert or MS student or approved by instructor or program director.

Course Objectives

- Understand challenges of AI applications in healthcare
- Understand AI models and methods
- Develop machine learning and deep learning models
- Analyze and validate AI models and methods
- Develop translational methods for real world deployment
- Evaluate AI models for real world adoption

Like any other skill, your understanding of these concepts will develop only through extensive reading, writing, and practice.

Topic Outlines

- Introduction
- AI models and methods
- Machine learning and deep learning in healthcare
- Knowledge representation and other AI methods in healthcare
- Validation, error analysis
- Model under-specification
- Rapid learning, transfer learning, and calibration
- Bias in AI models and methods
- Explainable AI
- Human center AI
- Evaluation methods

Instruction Method

This course will use a combination of classroom instruction and lab experiments.

Expectations

- Work hard
- Show up on time
- Participate actively
- Address issues proactively

Course Material

Main Textbook:

This class will be based on journal articles. There are no required textbooks for this course.

Reference Books:

"*Artificial Intelligence: Applications in Healthcare Delivery*", Edited by Sandeep Reddy, Routledge, 2021, ISBN 9780429317415 (ebk)

Additional material will be available on the Course Web Site

Assignments and Grade Determination

Labs and projects (60%)	The labs and projects will give you the opportunity to explore one or more concepts in more depth and apply these concepts in small realistic applications
Homeworks (25%)	You will have homework assignments due for almost every class period.
Quizzes (15%)	There will be in-class quizzes in most weeks
Attendance	You are expected to attend every class meeting. See below.
Class Participation	Required. See below.

Final letter grades are assigned as follows:

A = 90% or above
B = 80% or above
C = 70% or above
F = below 70%

Class Preparation

This class is designed so that we can spend our limited, valuable class time answering questions, working out problems, and advancing what you already should have learned on your own while preparing for class. That means that you are expected to learn most of the basic material on your own before we meet for class. If you regularly attend class unprepared, please drop this course now and register for another. If you regularly attend class prepared, you're going to learn a lot.

Attendance

You are expected to attend (and participate positively in) every class meeting. If you are absent on any particular day, then we will all just assume that you have a very good reason for being absent. If a pattern of absences develops, we will deal with it individually and appropriately, including setting individualized attendance requirements.

Positive Class Participation

Positive class discussion and activity is perhaps the most important factor in making the course interesting and fun. Those of you who have a documented (with the University) learning disability that would prevent you from participating in class discussion should notify me early on. Those of you who feel that your learning style is not conducive to participating in class discussion should see me no later than the end of the first week of class.

AI Policies

While the use of AI is not mandatory in this course, I encourage you to consider utilizing AI as a tool to enhance your learning experience. There are many AI tools available including large language models (LLMs) such as Microsoft Copilot and OpenAI ChatGPT. Here are some guidelines to help you make the most out of AI, while ensuring ethical usage:

- Understand the limitations of AI tools: Recognize that LLMs such as ChatGPT have their constraints and may not always provide accurate information or answers. It requires thoughtful and well-crafted prompts to yield quality results.
- Verify information independently: If AI tools present a number or fact, assume it is incorrect unless you have reliable knowledge or can cross-reference it with other credible sources. Ultimately, you are responsible for the accuracy of information used in your work. Similar to Wikipedia, LLMs such as ChatGPT can be a good sounding board or beginning place for information, but frequently provides inaccurate information mixed in with true content.
- Treat AI as a tool: When employing AI in your assignments, explicitly acknowledge its use. Include a paragraph at the end of any AI-assisted work, explaining the purpose of using AI, the specific prompts used, and how it contributed to your results. Failure to do so would be a violation of academic honesty policies.
- Exercise ethical judgment: Be discerning about when it is appropriate to use AI as a tool. Consider the context and requirements of each task, ensuring that AI aligns with the assignment's objectives and guidelines.
- Information Responsibility: You are responsible for any errors or omissions provided by the tool. It works best for topics you understand.

Late Policy

Your assignments are considered late if they are not completed by the stated due date and time. If your assignment is late, you will usually have seven additional days to complete it for late credit (depending on whether anything contrary has been stated in the syllabus or assignment instructions.) Late credit equals a 20 point (or approximately a 20%) reduction to the grade you would have received. For example, if you would have received a grade of 90% for completing a particular assignment, you will receive a grade of 70%.

Extensions

Should you desire an extension for some reason, you must discuss it with me before the assignment is due.

Topics and Assignments

The latest reading and assignments list is always available on the course web site. We will likely update this list as we proceed throughout the semester. You are responsible for getting up-to-date information on the current readings and assignments.

Syllabus Subject to Change

The instructor reserves the right to alter this syllabus based on best practices that fit changing circumstances.

University Policies

Code of Student Responsibility:
"The *UNC Charlotte Code of Student Responsibility* (the Code) sets forth certain rights and responsibilities in matters of student discipline. The Code defines these responsibilities and guarantees you certain rights that ensure your protection from unjust imposition of disciplinary penalties. You should familiarize yourself with the provisions and procedures of the Code" (Introductory statement from the UNC Charlotte brochure about the Code of Student Responsibility). The entire document may be found at this Internet address: **http://legal.uncc.edu/policies/ps-104.html**

Academic Integrity:
All students are required to read and abide by the Code of Student Academic Integrity. Violations of the Code of Student Academic Integrity, including plagiarism, will result in disciplinary action as provided in the Code. Students are expected to submit their own work, either as individuals or contributors to a group assignment. Definitions and examples of plagiarism and other violations are set forth in the Code. The Code is available from the Dean of Students Office or online at: http://www.legal.uncc.edu/policies/ps-105.html.

Faculty may ask students to produce identification at examinations and may require students to demonstrate that graded assignments completed outside of class are their own work.

Course Credit Workload.
This 3-credit course requires 3 hours of classroom or direct faculty instruction and 6 hours of out-of-class student work each week for approximately 15 weeks. Out-of-class work may include but is not limited to: required reading and video viewing, written assignments, and studying for quizzes and exams.

Special Needs: If you have a documented disability and require accommodation in this course, contact Disability Services, Fretwell 230, phone: 687 4355 voice/TDD the first week of the semester. Information about available services may be found at http://legal.uncc.edu/policies/ps-51.html. Accommodations for learning will be arranged by that office and communicated to the Instructor. If you speak English as a second language, please inform the instructor.

Diversity Statement:

UNC Charlotte strives to create an academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socio-economic status.

All students are required to abide by the UNC Charlotte Sexual Harassment Policy (http://www.legal.uncc.edu/policies/ps-61.html) and the policy on Responsible Use of University Computing and Electronic Communication Resources (http://www.legal.uncc.edu/policies/ps-66.html). Sexual harassment, as defined in the UNC Charlotte Sexual Harassment Policy, is prohibited, even when carried out through computers or other electronic communications systems, including course-based chat rooms or message boards.

Religious Accommodation:
It is the obligation of students to provide faculty with reasonable notice of the dates of religious observances on which they will be absent by submitting a Request for Religious Accommodation Form to their instructor prior to the census date for enrollment for a given semester http://legal.uncc.edu/policies/ps-134.html . The census date for each semester (typically the tenth day of instruction) can be found in UNC Charlotte's Academic Calendar (http://registrar.uncc.edu/calendars/calendar.htm).