



**SYLLABUS**  
**Course Number TBD**  
**Artificial Intelligence, AI literacy and Medicine**

**Description of Course**

This semester long course offers senior medical students an in-depth exploration of artificial intelligence (AI) in healthcare, blending theoretical knowledge with hands-on experience. From foundational AI principles to its applications in diagnostics, treatment, and patient care, students will gain insights into the transformative role of AI in modern medicine. The overarching objective of the elective is to provide senior medical students with a comprehensive, working understanding of the principles, applications, challenges, and ethical considerations of artificial intelligence in healthcare, and help to be able to apply AI tools and methodologies into their own future medical practices beginning with the first day of internship.

**Maximum enrollment: (20)**

**Instructor and Contact Information**

**Elective Course Director:**

Allan J. Hamilton, MD, FACS  
Regents' Professor of Surgery Exec. Dir., Arizona Simulation  
Technology & Educ. Center, Director, Artificial Intelligence Division,  
Univ. Ariz. Health Sciences Professor. of Neurosurgery, Radiation  
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[allan@arizona.email.edu](mailto:allan@arizona.email.edu)

**Teaching Assistant and Course Coordinator:**

Kyle Mclemore  
ASTEC Research Tech  
[kmclmore@arizona.edu](mailto:kmclmore@arizona.edu)

**Participating Guest Faculty:**  
**TBA**

## Course Objectives

During this course students will:

1. Evaluate AI-driven tools and datasets and study ways to ensure they meet medical standards and can be trusted for patient care.
2. Gain an understanding of the ethical challenges posed by AI in healthcare and ways to ensure patient privacy, autonomy, and minimizing biases in AI-driven decisions.
3. Collaborate with both data scientists and AI specialists to ensure medical insights and AI methodologies align for optimal patient outcomes.
4. Gain experience recognizing where AI could be applied to enhance patient care, research, and operational efficiency in various medical settings, and ways to actively seek to implement these advancements in their practice.

## Expected Learning Outcomes

By the end of this course, students will be able to:

1. Analytical Proficiency: Critically evaluate AI-driven tools and datasets, ensuring they meet medical standards and can be trusted for patient care.
2. Ethical Consideration: Demonstrate the ability to navigate the ethical challenges posed by AI in healthcare, ensuring patient privacy, autonomy, and minimizing biases in AI-driven decisions.
3. Interdisciplinary Collaboration: Demonstrate the necessary skills to effectively collaborate with both data scientists and AI specialists to ensure medical insights and AI methodologies align for optimal patient outcomes.
4. Future-Forward Application: Recognize opportunities where AI could be applied to enhance patient care, research, and operational efficiency in various medical settings, and actively seek to implement these advancements in their practice.

## Absence and Class Participation Policy

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available by clicking [here](#).

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable: <http://policy.arizona.edu/human-resources/religious-accommodation-policy>.

## Required Texts or Readings

The textbook for the class is:

*The AI Revolution in Medicine: GPT-4 and Beyond*

By Peter Lee, Carey Goldberg, Issac Kohane

Available in Kindle, audiobooks, and paperback

Publisher: Pearson; 1st edition (May 6, 2023)

Language: English

Paperback: 304 pages

ISBN-10: 0138200130

ISBN-13: 978-0138200138

In addition, there will be assigned readings which will be available to elective participants online through a dedicated Perusall® account for users in this class. Use of this account is free of charge and

registered students will be provided with account logon and password information.

### **Required or Special Materials**

None

### **Assignments and Examinations: Schedule/Due Dates (if applicable)**

This general organization is designed to provide a balanced approach, starting from foundational concepts, delving into clinical applications, addressing challenges and ethical considerations, and culminating in forward-looking discussions and, by the last week, student-driven projects.

#### **Week 1: Introduction to AI and its Foundational Principles**

- Day 1-3: Basics of Artificial Intelligence, Machine Learning, Deep Learning.
- Day 4-5: Introduction to programming languages and platforms relevant to AI (e.g., Python, TensorFlow).

Homework Assignments: Exploratory tasks related to AI concepts and basic programming.

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#### **Week 2: Applications of AI in Clinical Medicine**

- Day 6-8: AI in diagnostics (Radiology, Pathology), AI-driven decision support systems.
- Day 9-10: AI in treatment planning, predictive modeling, patient monitoring.

Homework Assignments: Engage with AI-driven diagnostic tools, evaluate AI predictions with real clinical scenarios.

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#### **Week 3: Challenges, Ethics, and Implementation of AI**

- Day 11-12: Integration challenges of AI in healthcare, AI in Electronic Health Records (EHRs).
- Day 13-14: Ethical considerations, data privacy, biases in AI, and patient autonomy.

Homework Assignments: Ethical case studies, data breach scenarios, and bias identification in AI models.

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#### **Week 4: Future Prospects, Student Projects, and Conclusion**

- Day 15-17: Exploration of cutting-edge AI applications, including AR/VR in medicine, genomics, and AI's role in global health.
- Day 18-19: Group project work, where students identify a medical challenge and propose an AI-driven solution.
- Day 20: Project presentations, course reflection, and discussion on career opportunities in medical AI.

### **Grading Scale and Policies**

**The AI elective is a non-clinical elective and is on a Pass/Fail basis only**

#### **Homework:**

Homework (reading & viewing) assignments are due at or before the assigned deadline.

Reading assignments are due at or before the assigned deadline.

If a 48-hour extension for readings is requested, the assignments must be completed within the 48-hour extension period. If they are not, they are considered late.

Students are not permitted to submit final projects after the assigned deadline. Failure to present a project will significantly jeopardize the student's ability to pass this elective.

## **Scheduled Topics/Activities**

The layout and schedule of the course is tentative and subject to change without notice\*\*

In general, each day of the elective (M-F, minus Federal holiday) is divided into relatively short didactic sessions, following by much longer, hands-on practicums where students can delve into obtaining hand-on experience using and manipulating AI models. Participants may wish to form collaborative groups for practicum exercises. Faculty assignments for individual assignments for didactic and class sessions is still currently under review.

## **Classroom Behavior**

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

## **Attendance Policy**

Any student who fails to attend a class will lose 5 points/100 points per day of absence. Students with less than 65/100 participation points to be given the option of either a failing grade or an “incomplete”. The incomplete can only be remedied by a month of independent study in AI, offered through the ASTEC facility, in order to make up the missed work. This option is purely at the elective course director’s discretion.

Pre-approved absences for medical, personal, or for any sincerely held religious belief, observance, or practice will be accommodated where reasonable. Refer to the Religious Accommodation Policy.

Absences pre-approved by the University Dean of Students (or dean’s designee) will be honored.

The UA’s policy concerning Class Attendance, Participation, and Administrative Drops is available by clicking [here](#).

## **Threatening Behavior Policy**

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

## **Safety on Campus and in the Classroom**

For a list of emergency procedures for all types of incidents, please visit the website of the Critical Incident Response Team (CIRT): <https://cirt.arizona.edu/case-emergency/overview>

Also watch the video available at

[https://arizona.sabacloud.com/Saba/Web\\_spf/NA7P1PRD161/common/learningeventdetail/crtfy000000000003560](https://arizona.sabacloud.com/Saba/Web_spf/NA7P1PRD161/common/learningeventdetail/crtfy000000000003560)

## **Accessibility and Accommodations**

At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience barriers based on disability or pregnancy, please contact the Disability Resource Center (520-621-3268, <https://drc.arizona.edu/>) to establish reasonable accommodations.

### **Physical and mental-health challenges**

If you are facing physical or mental health challenges, please note that Campus Health provides quality medical and mental health care. For medical appointments, call (520) 621-9202. For After Hours care, call (520) 570-7898. For the Counseling & Psych Services (CAPS) 24/7 hotline, call (520) 621-3334.

### **Code of Academic Integrity**

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: <https://deanofstudents.arizona.edu/policies/code-academic-integrity>.

The University Libraries have some excellent tips for avoiding plagiarism, available at <http://new.library.arizona.edu/research/citing/plagiarism>.

### **UA Nondiscrimination and Anti-harassment Policy**

The University of Arizona is committed to creating and maintaining an environment free of discrimination. In support of this commitment, the University prohibits discrimination, including harassment and retaliation, based on a protected classification, including race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, or genetic information. For more information, including how to report a concern, please see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

**Confidentiality of Student Records** <https://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa>

### **University and COM-T Policies**

See [University of Arizona Policies](#)

See [COM-T Student Policies](#)

### **Subject to Change Statement**

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.