

ARTIFICIAL INTELLIGENCE IN MEDICINE (AIM)

AIM 5030 - Introduction to Artificial Intelligence in Medicine

3 Credits

This course provides a comprehensive introduction to the fundamental concepts and methods of Artificial Intelligence, with a particular emphasis on applications in medicine and healthcare. Students will explore how intelligent systems perceive their environment, make decisions, learn from data, and reason under uncertainty. The course covers foundational AI topics including intelligent agents, classical search, adversarial decision-making, constraint satisfaction, knowledge representation, logical reasoning, automated planning, and probabilistic inference. Throughout the semester, students will gain hands-on experience implementing core AI algorithms and applying them to real-world problems. By integrating theory with practical examples, students will develop a solid understanding of how AI systems can support diagnostics, decision support, and intelligent automation.

AIM 5430 - Reinforcement Learning for Clinical Decision Making

3 Credits

This course introduces the theory and application of Reinforcement Learning (RL) for improving clinical decision making in healthcare. Students will learn how sequential decision processes can be modeled using Markov Decision Processes (MDPs) and solved using modern RL algorithms such as dynamic programming, temporal-difference learning, Q-learning, and policy gradient methods. The course emphasizes challenges unique to healthcare limited data, partial observability, delayed outcomes, safety, fairness, interpretability, and clinician-in-the-loop design. Through a combination of lectures, hands-on programming, and case studies, students will analyze observational clinical datasets, build RL models for treatment optimization, and critically evaluate the reliability and ethical implications of deploying RL in real-world clinical settings. By the end of the course, students will be able to design, implement, and assess RL-based decision support tools tailored for medical applications.

AIM 5530 - Telehealth & Telemedicine

3 Credits

This course introduces students to the principles, technologies, and applications of telehealth and telemedicine in modern healthcare. Students will explore the infrastructure, regulatory frameworks, and digital tools that enable remote clinical care, patient monitoring, and health data exchange. Emphasis is placed on integrating telehealth into healthcare delivery systems, evaluating clinical outcomes, and understanding the ethical, legal, and privacy considerations associated with digital health. The course combines theoretical knowledge with practical insights into designing, implementing, and managing telemedicine programs across diverse clinical contexts.

AIM 5630 - AI for Precision Medicine, Genomics & Diagnostics

3 Credits

This course explores the application of artificial intelligence (AI) and machine learning (ML) techniques in precision medicine, genomics, and clinical diagnostics. Students will learn to analyze high-dimensional biological and clinical data, develop predictive models for disease risk, progression, and treatment response, and integrate multi-omics and electronic health record (EHR) data for personalized healthcare solutions. The course emphasizes ethical, regulatory, and interpretability considerations, preparing students to design AI-driven solutions that improve diagnosis, prognosis, and therapeutic decision-making.

AIM 5910 - Graduate Internship

1-3 Credits (Repeatable up to 6 credits)

Graduate Internship.

AIM 5960 - Capstone Experience

3 Credits

This course provides students in the Artificial Intelligence in Medicine program with a structured, experiential learning opportunity in an industry or clinical setting. Students apply AI methodologies to real-world healthcare challenges, gain insight into the interdisciplinary roles within data science and healthcare innovation teams, and develop professional networks that support career advancement and leadership in AI-driven medicine.