HEALTH INFORMATION TECHNOLOGY (HIT)

HIT 421 | INTRODUCTION TO HEALTH INFORMATICS | 4 quarter hours
(Graduate)
This course covers fundamental concepts related to the role of health informatics (HIT) in modern healthcare, including how data is generated, managed, and utilized. The course is meant to provide an introduction to a wide array of topics within health informatics, across a range of settings from hospitals to clinical research to community-based public health and beyond. We will look not only at the technical side, but also at the interaction of people, information, and systems within healthcare. Course topics will include: different kinds of health data, types of healthcare systems, various actors within healthcare (doctors, patients, payors etc.), role of data science and machine learning in healthcare, AI for health, digital health technology, public health informatics, bioinformatics, clinical research systems, ethics, and types of careers in health informatics. The goal of the course is for students to develop a broad understanding of how all these topics interconnect in the practice of modern health informatics, and to lay the foundation for students to take more advanced courses in HIT in the future.
IT 403 is a prerequisite for this course.

HIT 422 | HEALTHCARE SYSTEMS & DATA | 4 quarter hours
(Graduate)
This course focuses on the various kinds of data systems across different settings in modern healthcare, and how design choices related to such data systems can impact the practice of healthcare and thus human health. We will explore such technology both from the perspective of the provider (e.g. doctor, hospital) as well as the perspective of the patient, to understand the human side of such data systems. We will also look more broadly at data management for clinical research trials, pharmaceuticals, and public health. Course topics will include: data ecosystems in healthcare, electronic heath records, data integration and exchange, healthcare data challenges, clinical systems, billing systems for payors, patient-facing systems, clinical research data management, and "big data" in healthcare. This course will provide an in-depth exploration of the vast array of roles that data plays in modern healthcare, and the skills necessary to manage such data.
CSC 401 is a prerequisite for this class.

HIT 423 | DIGITAL HEALTH | 4 quarter hours
(Graduate)
This course focuses on how digital technology can be used in modern healthcare, as well as to improve the everyday health and well-being of people in the real-world beyond the clinic. We will explore both the devices (hardware) and data science behind creating digital therapeutics (DTx) for a range of health conditions. The course will include a mix of lectures and hands-on activities, which will involve designing your own digital health solution (in groups). Course topics will include: DTx, mHealth, wearables, IOT devices, smart homes, healthcare robotics, virtual health assistants, digital biomarkers, AI in digital health, computing architecture for digital health, prototyping methods, and related ethical issues. The course is an opportunity to see how healthcare is changing in a world where the lines between the physical and the digital are increasingly blurring.
HIT 421 or HIT 422 is a prerequisites for this class.

HIT 430 | ELECTRONIC HEALTH RECORDS | 4 quarter hours
(Graduate)
Comprehensive overview of principles and practices of Electronic Health Records (EHR) management, including data standards and integration, interoperability and information exchange models, data security, and privacy.

HIT 451 | ACCOUNTING AND FINANCIAL MANAGEMENT IN HEALTHCARE | 4 quarter hours
(Graduate)
This course is intended to prepare the student to effectively interact with accounting and financial management staff and participate in various aspects of financial control and planning. The curriculum provides an historical perspective of financial management in healthcare, identifying trends in the industry and the forces that influence the financing of healthcare organizations. Financial statements, the interpretation and analysis of financial reports, and topics such as cost-benefit analysis, budgeting, and capital management will also be addressed. Consideration will be given to the cost effectiveness and financial future of healthcare organizations.
HIT 421 or HIT 422 is a prerequisites for this class.

HIT 511 | HEALTHCARE MANAGEMENT IN NON-HOSPITAL SETTINGS | 4 quarter hours
(Graduate)
While the hospital is the centerpiece of the healthcare system, so much healthcare is delivered outside this setting. Students will be introduced to many healthcare services outside the traditional setting of the hospital and gain knowledge of the operations of such healthcare settings. The course will be divided into four parts: Traditional care, Diagnosing, Acute-Care Treatment, and Chronic Care and within each area students will explore the basic settings such as outpatient clinics and surgical centers, pharmacies, outpatient laboratories, chiropractic centers, and adult day care, and hospice care. Prerequisite(s): Status as a Health Informatics student is a prerequisite for this class.

HIT 517 | PUBLIC HEALTH INFORMATICS | 4 quarter hours
(Graduate)
Public Health Informatics provides an overview of the evolving use of data and information systems to improve public health, and the increasing role of AI technologies in the field of public health. Various public health topics will be reviewed including: history of public health, structure and functions, public health data, surveillance tools, epidemiology principles, environmental health, health communication strategies, and global health informatics. Information systems and tools particularly relevant to key public health areas will also be covered. We learn about community health assessments and investigate the use of public health data to monitor the health of the community at different demographic and/or spatial levels. The course will examine informatics issues that complicate their use for public health, such as data and vocabulary standards, government policy, privacy and security, interoperability, data integration, etc. The course content will be delivered through a combination of lectures, presentations, in class exercises, and discussions. Students will gain hands-on experience in how informatics can be used to help solve important public health and global health problems.
HIT 422 or HIT 423 is a prerequiste for this class.

HIT 535 | MOBILE HEALTH (MHEALTH) | 4 quarter hours
(Graduate)
Wireless and Mobile health (mHealth) aims to improve our health and well-being by utilizing data provided by technologies such as wearables, IoT devices, and mobile phones. This course will cover foundational knowledge and topical work in mHealth. Students will learn the essential steps needed to develop a mHealth system from conception to evaluation through assigned reading, group discussions, and some hands-on projects. Since mHeath is an interdisciplinary field, we will cover a range of literature on human-computer interaction, wearable systems, machine learning, and health. Readings and in-class activities will prepare students for their final creative assignment that involves writing and presenting a research proposal for a mHealth system or research idea. Although this course will cover some technical aspects of mHealth, we encourage students with different backgrounds to enroll as they will work in interdisciplinary teams.
HIT 423 or (HIT 421 and HIT 422)

HIT 540 | ROBOTS IN HEALTHCARE | 4 quarter hours
(Graduate)
This course focuses on development of applications of robots in healthcare, including physical robots, virtual avatars, human-robot interaction (HRI), and other autonomous interactive devices (e.g. internet-of-things [IOT] devices). In particular, we are interested in 1) how we can create more life-like interaction with robots and other autonomous devices via modeling of interaction data, as well as 2) how we can use data from such devices to monitor real world environments in order to improve people's daily life and health. The course will include a mix of lectures and lab-based activities, which will involve learning theory as well as creating your own robotic device (in groups) to solve a specific health problem, gathering data, and evaluating your solution. Course topics will include: history of robots in healthcare, applications of robots in healthcare, HRI design principles, IOT techniques, intro to mechatronic components, experimental methods in healthcare robotics, ethical concerns, and the intersection of data science & healthcare robots. The course is an opportunity to see how autonomous devices such as robots are increasingly playing a role in human health, both within the clinic and at home.
HIT 423 or (HIT 421 and HIT 422)

HIT 575 | AI HEALTH ENTREPRENEURSHIP | 4 quarter hours
(Graduate)
This course delves into creating health ventures from the start, aiming to help learners unlock the potential of digital health to improve health and healthcare. This experiential course provides a framework for learners to think strategically and entrepreneurially covering ideation, design, customer development, prototyping, business models, intellectual property, ethics, reimbursement, sales, pitching and teamwork. It is for those keen on health innovation, startups, global health and healthcare venture capital, whether as an entrepreneur, investor, or firm employee. Students get a complete view of the digital health entrepreneurial landscape, now emphasizing AI, digital therapeutics, medical devices and robotics. Aligned with this view are five perspectives embedded within this course: patient, provider, innovator, business, and system.
HIT 423 is the prerequiste for this class.

HIT 590 | TOPICS IN HEALTH INFORMATICS | 4 quarter hours
(Graduate)
Advanced study focusing on a specific area of health informatics each quarter. May be repeated for credit. PREREQUISITES: Instructor consent required.