INFORMATICS (INF)

INF 605. Intro to Programming-Python.   3 Credits.
Python for Informatics equips graduate students with essential Python programming skills tailored for applications in informatics. From foundational syntax to intermediate data analysis and visualization techniques, students will gain hands-on experience in solving real-world problems using Python. Emphasis is placed on practical applications, including data manipulation and visualization, enabling students to make data-driven decisions across various domains.
Prerequisites: None
Offered: Every year, Fall

INF 606. Database Systems.   3 Credits.
This course provides an advanced study of the theory and application of database systems. Topics include data modeling and the relational model, query languages, relational database design, and physical database design.
Prerequisites: None
Offered: Every year, Fall

INF 607. Introduction to Cybersecurity.   3 Credits.
This course will introduce students to basic cybersecurity concepts, including risk management, threats, vulnerabilities, and defense techniques.
Prerequisites: None
Offered: Every year, Spring

INF 620. Introduction to Health Informatics.   3 Credits.
Health Informatics is the umbrella term for the domains of clinical (i.e. dental, imaging, nursing, pharmacy) and public health informatics. This course provides a comprehensive overview of the field of health informatics, focusing on the fundamental knowledge of health informatics and application of information technology to healthcare delivery and management. Students will explore key concepts such as electronic health records (EHRs), health information exchange (HIE), data standards and the role of informatics in improving patient outcomes and healthcare efficiency. By the end of the course, students will have a foundational understanding of how informatics supports clinical decision-making and enhances healthcare services.
Prerequisites: BS degree in Computer Science or Health Profession is strongly recommended, but not required.
Offered: Every year, Fall

INF 621. Ethical and Legal Issues in Healthcare Informatics.   3 Credits.
This course delves into the critical ethical and legal challenges associated with the use of information technology in healthcare. Students will examine topics such as patient privacy, data security, informed consent, and the ethical implications of emerging technologies like artificial intelligence and big data analytics. The course also covers relevant laws and regulations, including HIPAA and GDPR, and their impact on healthcare informatics practices. Through case studies and discussions, students will develop the skills to navigate complex ethical dilemmas and ensure compliance with legal standards in the healthcare informatics field.
Prerequisites: Take INF 620. Minimum C required.
Offered: Every year, Fall

INF 622. Controlled Medical Terminology.   3 Credits.
Controlled Medical Terminologies (CMTs) are collections of concepts that can be used to unify and consolidate disparate terminologies in the medical domain. CMTs have been used to encode drugs, diagnoses, procedures, etc and are core components of computer-based tools in the healthcare industry. This course focuses on the standardization and management of medical terminology within healthcare systems. Students will learn about various controlled terminology systems, such as ICD, MeSH, SNOMED, LOINC, UMLS, FMA and will be introduced to classification systems. The course emphasizes the importance of accurate and consistent terminology for effective communication, data exchange, and interoperability in healthcare.
Prerequisites: Take INF 620. Minimum C required.
Offered: Every year, Spring

INF 635. Introduction to Legal Informatics & Ethics.   2 Credits.
This course provides a comprehensive overview of the intersection between law and information technology. Students will explore the foundational principles of legal informatics, including the use of technology in legal practice, legal research, and the management of legal information. The course will also delve into the ethical considerations and challenges that arise in the digital age, such as data privacy, cybersecurity, and the ethical use of artificial intelligence in legal contexts. Students will gain a solid understanding of how informatics is transforming the legal landscape and the ethical implications of these advancements.
Prerequisites: None
Offered: Every year, Spring

INF 636. Legal Research.   1 Credit.
This course introduces the fundamentals of research and information literacy in a legal context. The course focuses on both free and subscription-based online platforms and resources; navigating algorithmic bias; the promises and pitfalls of generative artificial intelligence; the legal research process; and effectively locating, analyzing and using appropriate secondary sources and primary authority.
Prerequisites: None
Offered: Every year, Spring

INF 637. Cybersecurity Law.   3 Credits.
Cybersecurity is a rapidly developing area of the law with roots in constitutional law and privacy rights. Topics include Fourth Amendment freedoms from government search and seizure, privacy rights limiting corporate and government collection and use of personal information, data security laws, data breach litigation, computer hacking cases, developing legislation in the United States and Europe, and public policy around all of these topics.
Prerequisites: None
Offered: Every year, Fall

INF 638. Law Practice Management.   **3 Credits.**
This course will provide students with the knowledge and skills to build and manage a law practice that serves clients well, is profitable, personally rewarding, and prepared for the 21st century, while emphasizing the ethical implications of sound law practice management. The course will focus on general management principles applied to the law office, client relations, fee agreements, docket control and conflicts of interest, malpractice insurance and risk management, timekeeping and billing, personnel management, the 21st century law office library, practice management technology and equipment. The format will include guest lecturers, and individual and group-based projects addressing the problems and issues that arise when managing a law practice.
Prerequisites: None
Offered: Every year, Fall

INF 651. Big Data Management.   **3 Credits.**
This course explores advanced techniques for managing, processing, and analyzing large-scale datasets. Students learn cutting-edge technologies such as Hadoop, Spark, and distributed computing frameworks, gaining practical skills in extracting valuable insights from massive datasets. Emphasis is placed on real-world applications and hands-on experience, preparing students for careers in data-intensive fields.
Prerequisites: Take INF 605 and INF 606. Minimum grade C required.
Offered: As needed

INF 652. Data Mining.   **3 Credits.**
This course delves into the theory and application of extracting patterns and knowledge from large datasets. Through algorithms such as clustering, classification, and association rule mining, students learn to uncover valuable insights for decision-making. Practical exercises and projects emphasize real-world data analysis scenarios, equipping students with essential skills for leveraging data mining techniques in various informatics domains.
Prerequisites: Take INF 605 and INF 606. Minimum grade C required in both.
Offered: As needed

INF 653. Machine Learning.   **3 Credits.**
This course provides a comprehensive introduction to algorithms and techniques for pattern recognition and predictive modeling. Covering supervised and unsupervised learning methods, students gain proficiency in algorithm implementation and model evaluation. Through hands-on projects and case studies, students apply machine learning concepts to real-world informatics problems, enabling data-driven decision-making skills.
Prerequisites: Take INF 605.Minimum grade C required.
Offered: As needed

INF 656. Applied Time Series Analysis.   **3 Credits.**
In this course students explore advanced methods for analyzing and forecasting time-dependent data. Students learn to model temporal patterns, detect trends, and make predictions using techniques such as ARIMA, exponential smoothing, and state-space models. Through practical exercises and case studies, students develop the skills to apply time series analysis in informatics domains such as finance, healthcare, and forecasting.
Prerequisites: Take INF 605 and INF 606. Minimum grade C required in both.
Offered: As needed

INF 658. Data-Driven Decision Making.   **3 Credits.**
This course equips students with the skills to leverage data effectively in decision-making processes. Through case studies and practical applications, students learn to collect, analyze, and interpret data to inform strategic choices. Emphasizing critical thinking and quantitative reasoning, this course prepares students to make informed decisions across diverse informatics domains.
Prerequisites: Take INF 605 and INF 606 or equivalent. Minimum grade C required in both.
Offered: As needed

INF 659. Probability & Data Analysis.   **3 Credits.**
This course provides a foundation in statistical principles and methods essential for analyzing and interpreting data. Through theoretical concepts and practical applications, students learn probability theory, hypothesis testing, and statistical modeling techniques. Emphasis is placed on understanding uncertainty, making informed decisions, and applying statistical methods to extract meaningful insights from data within informatics contexts.
Prerequisites: Take INF 605, or equivalent. Minimum grade C required.
Offered: As needed

INF 670. Generative AI for Informatics.   **3 Credits.**
This course explores cutting-edge techniques in artificial intelligence focused on generating novel data and content. Students delve into deep learning architectures such as Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs), learning to create realistic synthetic data and generate creative outputs. Through hands-on projects, students apply generative AI techniques to various informatics domains, promoting innovation and advancing data-driven solutions.
Prerequisites: Take INF 605, or equivalent. Minimum grade C required.
Offered: As needed

INF 673. MS Thesis.   **3 Credits.**
Only applies if a student chooses to do MS Informatics with Thesis: This course is a requirement for the thesis option within the MS in Informatics. Students must demonstrate both breadth and depth of knowledge in their field of specialization. They also must demonstrate scientific research skills and present their findings to a thesis committee.
Prerequisites: None
Offered: As needed

INF 674. MS Thesis II.   **3 Credits.**
Only applies if a student chooses to do MS Informatics with Thesis: This course is a continuation of INF 673 MS Thesis I and is a requirement for the thesis option within the MS in Informatics.
Prerequisites: Take INF 673.
Offered: As needed

INF 676. Internship Credit.   **1-3 Credits.**
Only applies if a student chooses to do internship and uses the time spent for credit. The Internship for Credit course requires advanced approval from the program director. One academic credit is awarded for every 50 hours of internship work, with a maximum up to 3 credits per semester or term. A maximum of 6 academic credits may be earned for internship experiences.
Prerequisites: None
Offered: As needed

INF 680. Foundations of Epidemiology and Public Health.   3 Credits.
This course introduces students to the principles and methods of epidemiology and their application to public health practice. Topics include the study of disease distribution, determinants of health, and the use of epidemiological data in public health decision-making. Students will learn about various study designs, data collection techniques, and statistical methods used in epidemiology. The course also covers the role of public health in disease prevention and health promotion.
Prerequisites: Take INF 620. Minimum grade C required.
Offered: As needed

INF 681. Healthcare Organization and Delivery.   3 Credits.
This course provides an overview of the structure and function of healthcare systems, with a focus on the organization, financing, and delivery of healthcare services. Students will explore different models of healthcare delivery, the roles of various healthcare providers, and the impact of policy and regulation on healthcare systems. The course also examines current challenges and trends in healthcare delivery, including quality improvement and patient-centered care.
Prerequisites: Take INF 620. Minimum grade C required.
Offered: As needed

INF 682. Health Information Standards & Interoperability.   3 Credits.
This course covers the standards and protocols essential for achieving interoperability in healthcare information systems. Students will learn about key standards such as HL7, FHIR, DICOM, and CDA, and their role in facilitating data exchange and integration across different healthcare systems. The course emphasizes the importance of interoperability for improving healthcare outcomes and efficiency. Through practical exercises, students will gain experience in implementing and using these standards in real-world scenarios.
Prerequisites: Take INF 620. Minimum grade C required.
Offered: As needed

INF 683. The Design, Implementation, and Evaluation of EHR Systems.   3 Credits.
Electronic Health Records (EHR) are seen as one of the most effective ways to improve healthcare. This course focuses on the lifecycle of electronic health record (EHR) systems, from design and implementation to evaluation and optimization. Students will learn about the key components of EHR systems, best practices for system implementation, including information technology infrastructure needed to support the EHR, and methods for evaluating system performance and impact on healthcare delivery. The course also covers challenges and strategies for achieving user adoption and ensuring data quality and security, while providing the learner with an opportunity to examine how the EHR will affect clinical outcomes and disease management.
Prerequisites: Take INF 620 and INF 622. Minimum grade C required in both.
Offered: As needed

INF 684. Disease Processes & Systems.   3 Credits.
Information technology has become an integral part of modern healthcare. Applications of health informatics can substantially improve the practice of healthcare - including planning, decision analysis and policy-making, management and implementation of medical interventions, and health research. This course focuses on the knowledge and skills that are critical to understanding common diseases and their impact on body systems, and the use of technology to quickly and efficiently collect, organize, analyze, interpret, manage, store and present information relevant to healthcare. Students will explore the mechanisms of disease development and progression, look at how healthcare databases are used and gain an understanding of how consumers gain access to and assess health information.
Prerequisites: Take INF 620. Minimum grade C required
Offered: As needed

INF 690. Law, Science, and Tech.   3 Credits.
This course explores several areas in which scientific and technological advances have had an impact on the legal system, either by calling for changes in the system itself, or by provoking attempts to impose legal controls on the conduct of scientific research or the uses of scientific knowledge. The different approaches of law and science to problems of causation and proof are discussed. Specific topics that may be discussed as illustrative of the problems arising at the interface of law and science include (time permitting): behavioral research and the application of social science data to the legal system, the use of scientific and statistical evidence in court, problems created by the computer, legal regulation of scientific research that poses apparent ethical or health problems, and legal control of technology that poses real or apparent hazards to public health (e.g. nuclear reactors).
Prerequisites: None
Offered: As needed

INF 691. Information E-Discovery and Digital Evidence.   3 Credits.
This course delves into the critical aspects of electronic discovery (e-discovery) and the use of digital evidence in legal proceedings. Students will explore the processes and technologies involved in identifying, collecting, preserving, and analyzing electronically stored information (ESI) for use in litigation and investigations. The course covers key topics such as the legal and regulatory frameworks governing e-discovery, best practices for managing digital evidence, and the challenges associated with handling large volumes of data. Additionally, students will examine the role of digital forensics in uncovering and interpreting digital evidence, as well as the ethical considerations and privacy issues that arise in the context of e-discovery.
Prerequisites: None
Offered: As needed

INF 692. Information Privacy Law.   2-3 Credits.
As the Internet continues to expand throughout society and in our daily lives, cybersecurity, privacy, and anonymity legal issues are becoming increasingly important. Students in this course will study both US and European data protection and privacy regimes, with an emphasis on US law. Students will explore the legal frameworks of US privacy laws as they apply to specific industries and types of information holders and users, analyzing relevant statutes, civil litigation, and FTC enforcement actions as well as actual contract language (i.e., online privacy policies and data protection language). Students will engage with the most current cases and will work on practical legal issues relevant to corporate clients. The objective of the course is for students to develop a broad foundation and skill set in this rapidly evolving area of law.
Prerequisites: None
Offered: As needed

INF 693. Litigation and Courtroom Technologies.   **3 Credits.**
This course explores the transformative impact of technology on litigation and courtroom procedures. Students will examine the various technological tools and systems that enhance the efficiency and effectiveness of legal proceedings, from electronic filing systems and digital case management to advanced presentation software and virtual courtrooms. The course covers the practical application of these technologies in trial preparation, evidence presentation, and courtroom management.
Prerequisites: None
Offered: As needed

INF 694. Understanding AI: Promises and Pitfalls In the Legal Profession.   **1 Credit.**
In today's rapidly evolving technological landscape, artificial intelligence (AI) has emerged as a disruptive and transformative force with profound implications for the legal profession. This symposium course delves into the world of generative AI technologies, focusing specifically on their applications within the practice of law. Through guest lectures, case studies, and hands on application, this course explores the challenges, ethical considerations, and innovations associated with the integration of AI in legal practice.
Prerequisites: None
Offered: As needed

INF 695. Legal Analytics.   **1 Credit.**
This course introduces students to the principles and applications of analytics in the legal field. Focusing on the use of data-driven decision-making, students will learn how to leverage statistical and computational techniques to analyze legal data and improve legal outcomes. Key topics include predictive analytics, data visualization, and the use of machine learning algorithms in legal contexts.
Prerequisites: None
Offered: As needed

INF 696. Health Information Privacy and Security.   **2 Credits.**
Health information privacy and security are critical components of the current health care culture and health law environment. This course provides an introduction to these privacy and security concerns and surveys key issues including electronic health records, the exchange of health information, privacy breaches, and the globalization of health care and clinical research. The course will discuss the interplay of federal health care privacy law with state privacy law with a focus on the federal Health Information Technology for Economic and Clinical Health Act (HITECH) and the Health Insurance Portability and Accountability Act (HIPAA). The course will also present an overview of international healthcare privacy considerations in cross-border healthcare-related transactions, including tele-health consultations and global research. In addition to reviewing the legal authority, the course will feature sample case studies for analysis and discussion and will emphasize creative, critical thinking about health care privacy and security law in the context of the "real world".
Prerequisites: None
Offered: As needed