HEALTH INFORMATICS AND DATA SCIENCE (HIDS)

Discover, search, courses (https://catalog.luc.edu/course-search/)!

HIDS 401 Foundations of Health Informatics (3 Credit Hours)
This course offers students a broad overview of health informatics as a foundation for further study of the topic. Designed as a survey of informatics domains as well as primer of informatics methods, this course serves as an introduction for anyone interested to ask good informatics questions, employ informatics tools, or design informatics systems across a broad range of biomedical applications.
Outcomes:
Understand the differences between data, information, and knowledge, and analyze the processes to transform data into actionable knowledge in the context of health and biomedical domains; Understand the particular nature of data, information, and knowledge in health, analyze the importance and limitations of coding standards; Analyze and evaluate the role of health informatics and its societal impact; Analyze the current trends and current issues in health informatics

HIDS 411 Clinical Data Science (3 Credit Hours)
Clinical Data Science provides students with an introduction to a broad range of concepts and methods in data science, as they pertain to biomedical research. The focus of the class is on introducing key methods ranging from data collection and storage, to probabilistic methods, etc.
Outcomes:
Understand and describe the steps in the life cycle in biomedical and clinical research; Understand the key principles of data management; Apply, analyze, and evaluate data structures, standards, and quality of data in large biomedical databases and clinical research; Analyze and evaluate key data analytics concepts as they apply to biomedical research; Analyze ethical and legal issues when dealing with biomedical and clinical data

HIDS 412 Translational Bioinformatics (3 Credit Hours)
Pre-requisites: HIDS 411 Clinical Data Science
This course covers the fundamentals of bioinformatics and how they apply to translational and clinical problems. The purpose of this course is to give students a broad overview of the field of bioinformatics, and the tools commonly used, as well as the applications to practical biomedical issues, diseases, population health, drug discovery, etc. The students will also be exposed to a variety of open-source software for sequence alignment, SNPs discovery, and on how to access and analyze data from large biological databases, for translational and clinical research.
Outcomes:
Understand and apply a range of bioinformatics algorithms, and their computational efficiency; Apply and analyze informatics techniques to retrieve, store, and analyze 'omics' data; Apply and analyze open-source tools and open access databases to find and analyze data of translational and clinical importance; Analyze the current trends and problems in bioinformatics and how they relate to clinical issues, population and public health

HIDS 421 Security and Privacy in Healthcare (3 Credit Hours)
This course provides students with a broad exposure to concepts, policies, and methodologies in security and privacy, as they pertain to healthcare research and practice. Information security and data privacy are essential components of biomedical and clinical research, and therefore, it is critical for students to understand security guidelines.
Outcomes:
Understand the role of information security and data privacy in healthcare; Apply basic principles of computer security, such as confidentiality, integrity, and availability; Apply and analyze security principles in research data management; Analyze and evaluate the ethical and legal considerations associated with biomedical and clinical data; Understand and analyze the importance and role of the Institutional Review Board and its function with respect to protecting human subjects

HIDS 422 Ontologies in Healthcare (3 Credit Hours)
This course provides students with essential concepts of ontologies, building ontologies, and knowledge representation as they pertain to health care, and biomedical research. With the ubiquitous nature of computer systems, and information-based systems in health care (and everywhere!) there is a critical need to be able to represent information.
Outcomes:
Understand the role of ontologies in knowledge representation; Understand the differences between realist and anti-realist ontologies; Understand and describe the importance of propositional and predicate logic in knowledge representation and discovery; Understand basic principles of developing ontologies in health care; Build ontologies using computer ontology-building tools; Understand and describe how ontologies affect biomedical informatics systems and how we discovery new knowledge

HIDS 431 Introduction to Natural Language Processing in Health (3 Credit Hours)
Pre-requisites: HIDS 401 Foundations of Health Informatics and HIDS 411 Clinical Data Science
The objective of this course is to present a broad overview of methodologies to analyze and mine biomedical text automatically. Students will be exposed to some of the common and state-of-the-art software, algorithms and techniques to extract content and knowledge from biomedical texts. A particular emphasis will be placed on how these methodologies are used in the context of health care, clinical records and narratives, and how extracted information can be used to improve care.
Outcomes:
Understand and apply artificial intelligence methodologies and software to automatically extract information from unstructured text; Assess and evaluate advantages and disadvantages of such methodologies; Understand and analyze how machine learning tools are used in a clinical context; Analyze how NLP techniques enrich structured data, improve accuracy of diagnosis, and their role in learning health systems

HIDS 441 Human Centered AI for Healthcare (3 Credit Hours)
This is a survey course of AI user-facing systems for healthcare, that demonstrates the practical use of seminal algorithms in machine learning and AI, as well as principles of interaction design and user center design. In addition, the course focuses on how these design principles and algorithms can be blended to generate impactful systems that help bridge health disparities.
Outcomes:
Analyze the factors that influence a successful human interaction with computer systems for healthcare; Compare and contrast the opportunities and limitations of AI infused technologies for healthcare applications; Develop evaluation and testing plans for eHealth applications/devices that use AI; Design applications/devices that satisfy a healthcare need using principles of AI and human factors

HIDS 495 Independent Study (1-4 Credit Hours)
This is a directed study course in health informatics for approved students, supervised by a member of the faculty. Students must have an assigned professor, written objectives, planned outcomes and timelines.
Outcomes:
Students will be able to articulate a general understanding of the selected topic

HIDS 499 Health Informatics Capstone (1-3 Credit Hours)
Pre-requisites: Students in the HIDS program must have completed 2 semesters of course work
Development of an informatics project, including research question, literature review, and assessment.
Outcomes:
Development of a scholarly paper and presentation