

APPLIED HEALTH INFORMATICS (HINF)

HINF 6101. Concepts in Health Informatics. (4 Credits)

This course provides an overview of the academic discipline of health informatics, which itself is the confluence of the disciplines of healthcare, information science, computer science, and engineering. It provides students with their first hands-on experience with the open source software tools which underpin this applied health informatics program. The first lecture provides a general overview of health informatics, in alignment with the general structure of course topics in this program. Subsequent lectures provide an overview of each topic that is covered in more detail in the other eight courses. Note: Four-credit courses that meet for 150 minutes per week require three additional hours of class preparation per week on the part of the student in lieu of an additional hour of formal instruction.

Mutually Exclusive: CISC 6700.

HINF 6103. Models for Clinical Information. (4 Credits)

This course provides a broad perspective on the key concepts, requirements, and standards for modelling clinical information. Creating and managing clinical information using structured models is an essential requirement for many informatics services, including detailed analysis and reporting, decision support, big data analysis, and artificial intelligence. The two key international standards—ISO 13606 and Health Level 7 (HL7)—provide flexible frameworks for representing structured clinical information; an understanding of their scope and capabilities is essential for any student of health informatics. Note: Four-credit courses that meet for 150 minutes per week require three additional hours of class preparation per week on the part of the student in lieu of an additional hour of formal instruction.

HINF 6105. Electronic Health Records. (4 Credits)

The electronic health record can provide a full cradle-to-grave (longitudinal) record for a patient that is a vital tool to assist the provision of care in any setting: primary, secondary, or tertiary. In addition, a properly structured and coded record can act as a rich source of information for clinical studies and trials. This course provides students with hands-on experience of the requirements and functionality of electronic health records systems. The emphasis is on the use of patient centered record systems that manage structured clinical information. Students learn the importance of the EHR as a repository for clinical information, that has been integrated from many different sources, and the key functional requirements for working with the patient record: clinical data entry, viewing of the full longitudinal record, clinical correspondence, scheduling, ordering, and prescribing. Note: Four-credit courses that meet for 150 minutes per week require three additional hours of class preparation per week on the part of the student in lieu of an additional hour of formal instruction.

HINF 6111. The Business of Health Informatics. (4 Credits)

This course aims to equip students with the knowledge needed to apply health informatics for success in allied business environments—whether that environment is a public health service, a care provider organization, hospital, clinic, ancillary service provider, supplier business, or entrepreneurial start-up. Note: Four-credit courses that meet for 150 minutes per week require three additional hours of class preparation per week on the part of the student in lieu of an additional hour of formal instruction.

Attribute: HNEL.

HINF 6113. Engineering Clinical Information Systems. (4 Credits)

This course covers the technology and techniques required to design and implement effective health informatics systems. Starting from the general architecture of clinical information systems and telemedicine systems, students learn how to use relational and "no-SQL" databases to manage structured clinical data and how to design safe and usable clinical user interfaces. Note: Four-credit courses that meet for 150 minutes per week require three additional hours of class preparation per week on the part of the student in lieu of an additional hour of formal instruction.

Attribute: HNEL.

Mutually Exclusive: HADM 6100.

HINF 6115. Healthcare Integration. (4 Credits)

Integration of clinical information that originates from many different sources is a vital requirement for the provision of patient-centred care. With the emphasis placed on the patient, rather than the care provider, clinical information systems users must have access to all relevant patient data, from primary, secondary or tertiary care. Integration is enabled through the use of open standards, for both information and functional interfaces. This course covers the most important open standards and standards profiles for integration and provides hands-on experience with the key technologies. Note: Four-credit courses that meet for 150 minutes per week require three additional hours of class preparation per week on the part of the student in lieu of an additional hour of formal instruction.

Attribute: HNEL.

Mutually Exclusive: HADM 5800.

HINF 6117. Artificial Intelligence in Healthcare. (4 Credits)

Since the advent of artificial intelligence in the 1950s, many researchers have recognized its potential for application in healthcare. In the late 1960s and early 1970s, some of the earliest operational rules-based systems were for clinical decision making, and there was a second wave of interest in the 1980s with healthcare applications in the emerging technologies of Bayesian belief networks and artificial neural networks. Whilst general advances in AI continued into the 21st century, in such fields as natural language processing, image analysis and reasoning engines, it was not until the second decade of this century that mainstream interest in AI in medicine was renewed. This has been fueled by advances in general AI techniques and the growing availability of structured, coded clinical information. This course covers the background and AI techniques for mining linked data, clinical decision support, natural language processing, and decision making using different types of reasoning engines. Note: Four-credit courses that meet for 150 minutes per week require three additional hours of class preparation per week on the part of the student in lieu of an additional hour of formal instruction.

Attribute: HNEL.

Mutually Exclusive: HADM 5200.

HINF 6119. Analysis and Reporting in Healthcare. (4 Credits)

This course provides an overview and practical experience in the key tools and techniques for analyzing and reporting healthcare information. This includes the full longitudinal record for a single patient as well as the combined information set for a cohort of many patients. Those patient cohorts may first be assembled through query of the EHR, to satisfy requirements for reporting of clinical outcomes or measuring the effectiveness of clinical services. Or the cohorts may have been selected as part of clinical studies or trials, which have specific standards and requirements for analysis and reporting. Students learn about statistical techniques that have a long history of use in health informatics, together with newer techniques for analyzing "big data" generated from large scale, structured health records systems. Note: Four-credit courses that meet for 150 minutes per week require three additional hours of class preparation per week on the part of the student in lieu of an additional hour of formal instruction.

Attribute: HNEL.

Mutually Exclusive: CISC 5109.

HINF 6210. XML in Healthcare. (4 Credits)

This course provides a hands-on introduction to the use of XML in healthcare. It starts with the basics of the XML syntax, builds through the introduction of related XML standards, and then takes a look at how XML is used for structured messages, information storage, semantic technologies, and ontologies. The final topics of the course look at the use of XML for Artificial Intelligence in Healthcare and for Electronic Health Records. Each class consists of a lecture, followed by a hands-on exercise that students complete using the machines and software provided, with the assistance of the course tutors.

Attribute: HNEL.

HINF 6211. Health Data Analytics Leadership. (4 Credits)

This is a course in leadership development. It is geared for both purchasers and sellers of analytics. The goal is to continuously improve the demonstrable value of health care. Each topic covers a vital step in the process to achieve that goal. The objectives are to understand the types and value of health data analytics, appreciate the perspectives of both buyers and sellers of health data analytics, learn how to introduce effective analytics capabilities to a health care organization, and equip students with the skills required to be a chief analytics officer.

Attribute: HNEL.

HINF 6212. State of the Art in Health Informatics. (4 Credits)

This course covers special topics in health informatics that reflect the current state of the art or lie outside the scope of the other courses offered. As with all the courses, the emphasis is on hands-on experience and applied knowledge of technology. The syllabus for this course is reviewed at regular intervals to ensure that it reflects current trends in the ever-changing field. Reflecting this, guest lecturers are engaged for many of the classes, to bring practical expertise, relevant expertise, and an insight into current practices.

Attribute: HNEL.

HINF 6213. Model Driven Electronic Health Records. (4 Credits)

This course provides an intensive overview of the technology and standards for creating and deploying open source, model-driven Electronic Health Records (EHR). Each class consists of a lecture, followed by a hands-on exercise that students complete using the equipment and software provided, with the assistance of the course tutors. Learning Objectives The objectives of this course are to: · provide an overview of the concepts of model-driven development · familiarize students with the main open standards used—ISO 13606 and HL7 CDA · gain hands-on experience with the open source Mirth Connect integration engine and cityEHR electronic health records system · explore the application of integration tools and techniques in telemedicine, particularly the integration of clinical information gathered by devices at the point of care.

Attribute: HNEL.

HINF 6214. Integration for Healthcare and Telemedicine. (4 Credits)

This course provides an intensive study of the technology and standards for integration of information and systems in health care and telemedicine. Each class consists of a lecture, followed by a hands-on exercise that students complete using the equipment and software provided, with the assistance of the course tutors. Learning Objectives The objectives of this course are to: · provide an overview of the requirements and techniques for integration in health care · familiarize students with the main open standards used for integration—HL7 v2, HL7 CDA, HL7 FHIR, and ISO 13606 · gain hands-on experience with the open source Mirth Connect integration engine · Import and export structured records to/from the cityEHR electronic health records system · explore the application of integration tools and techniques in telemedicine, particularly the integration of clinical information gathered by devices at the point of care.

Attribute: HNEL.

HINF 6300. Special Topics in Applied Health Informatics. (4 Credits)

This course covers special topics in health informatics which reflect the state-of-the-art or lie outside the scope of the other courses offered. As with all the courses, the emphasis is on hands-on experience and applied knowledge of technology. The syllabus for this course is reviewed at regular intervals to ensure that it reflects current trends in the ever-changing field. Reflecting this, guest lecturers are engaged for many of the classes, to bring practical expertise, relevant expertise, and an insight into current practices. Note: Four-credit courses that meet for 150 minutes per week require three additional hours of class preparation per week on the part of the student in lieu of an additional hour of formal instruction.

Attribute: HNEL.

HINF 6497. Research Project/Thesis. (4 Credits)

Upon approval of a proposal developed under the stewardship of a faculty member, students work with a qualified supervisor to conduct research, collect data, analyze, test their hypotheses, and write up their findings. The finished thesis must demonstrate the student's ability to conduct comprehensive research and articulate original ideas and thought processes that make a practical contribution to the existing body of knowledge in the field of real estate. All final papers must meet academic and research standards that are consistent with the requirements of current journals and publications. In order to successfully complete the project, the student's supervisor and one other reader from either academe or industry must approve the thesis.

HINF 6498. Applied Project. (4 Credits)

In this course, which is subject to prior departmental approval, students undertake and deliver a real-world project for active practitioners in a field that is consistent with the student's career pursuits. Under the direction of a supervisor, students select and explore a topic to be developed. Students will then be required to generate a practical application of their findings that demonstrates professional-level mastery of the subject matter involved. The project will be reviewed by the supervisor and one other expert in the field.

HINF 8999. Tutorial. (4 Credits)

This is a tutorial course for students enrolled in the M.S. or Advanced Certificate programs in applied health informatics.