Health Information Management (HIM)

Course information contained within the Bulletin is accurate at the time of publication in June 2025 but is subject to change. For the most up-to-date course information, please refer to the Course Catalog.

HIM 5101. Fundamentals of Health Informatics. 3 Credit Hours.
This course provides an introduction to the history, reasoning, and development of systems focused on the generation, aggregation, and analysis of health data. Students will gain exposure to usability requirements - elements of design which impact selection - in addition to the issues impacting data liquidity in the healthcare system. The course will also consider the various types of health information systems that exist in organizations and serve as feeders to clinical repositories of information.

Repeatability: This course may not be repeated for additional credits.

HIM 5102. Applications of Computer Programming in Health Informatics. 3 Credit Hours.
It is critical to teach health professionals how to apply computer programming and health informatics for successful health data analysis and application development. This course will introduce the characteristics of health data and provide basic and advanced applications of computer programming, especially Python and R, specifically focused on healthcare data analytics and application developments. By the end of this semester, students will be able to perform health data manipulation using Python and R, building predictive models, discover trends, visualize and present the analytical results, and design machine learning approaches in healthcare big data in medicine, and solve associated data mining challenges on dealing with such complex heterogeneous data. This course is devised in two parts, 1) Introducing the corresponding programming functions and 2) Practical applications to real life health applications.

Repeatability: This course may not be repeated for additional credits.

HIM 5106. Technology for Population Health. 3 Credit Hours.
Individuals and organizations are increasingly dependent on technology for the creation of information relevant to health status. Technology is being utilized to monitor health or social behavior or provide interventions in the form of information, alerts, or the provision of information to advanced health practitioners. This course is intended to provide students an opportunity to assess existing and emerging technologies as they relate to the delivery of healthcare or the maintenance of health status.

Repeatability: This course may not be repeated for additional credits.

HIM 5111. Technology for Healthcare Financial Management. 3 Credit Hours.
This course examines the nexus of value based care, financial management, and healthcare payment. Students examine complex financial systems and explore the principles of payment as they apply to various types of health care settings. This course focuses on payment policy and reporting requirements, and the students become familiar with topics such as fraud and abuse, revenue cycle management, integration of clinical and financial systems, charge master data, and managerial implications of alternative payment models.

Repeatability: This course may not be repeated for additional credits.

HIM 5112. Health Information Systems: Design and Decision Making. 3 Credit Hours.
This course focuses on effectively designing and making informed decisions for strategically developing health technology and systems. Emphasizing the integration of the social determinants of health (SDOH), patient generated health data (PGHD) and social, behavioral, and information technology theories in the design process, students will learn the principles and best practices for managing and designing health informatics systems. Additionally, students will explore theories that inform the development of effective health informatics solutions. Topics include strategic health IT planning, stakeholder engagement, decision-making, and system design, along with emerging healthcare technologies.

Repeatability: This course may not be repeated for additional credits.

HIM 5113. Database Administration for Health Informatics Professionals. 3 Credit Hours.
Modern life science organizations rely on databases for transaction management, data analysis, outcomes assessment, and to satisfy the internal needs of the organization as well as to satisfy regulatory, legal, and accrediting bodies. The goal of the course is to provide hands-on use of database management tools promoting a strong understanding of database design, data modeling and structured query language for data definition and data manipulation, and data analysis tools including pivot tables. In addition, the course will explore operational database systems versus analytic systems, the importance of database design on data integrity, data warehousing, and data mining at modern health science organizations. Data formats, collection, and integrity as they relate to continual performance improvement, with specific attention to practitioner performance, are also stressed.

Repeatability: This course may not be repeated for additional credits.

HIM 5114. Health Informatics Project Management. 3 Credit Hours.
The development of interoperable electronic health record systems has resulted in increased systems integration, convergence, and complexity. Nearly half of all IT projects fail to meet budget, schedule, and functionality. The course provides a hands-on approach to systems analysis and management of health informatics (HI) projects. Students will be introduced to the concepts of managing HI projects by focusing on initiating, planning, executing, controlling, and closing projects in the context of topics such as integration, scope, timing, cost, quality, human resource, technology, communications, and risk and procurement. Students will also be provided an opportunity to analyze functional requirements for HI projects using a variety of process modeling approaches.

Repeatability: This course may not be repeated for additional credits.

HIM 5127. Privacy and Security: Protecting Healthcare Data. 3 Credit Hours.
This course focuses on privacy and confidentiality and current legislative and health policy issues for electronic health record systems (EHRs). Ethical issues related to EHRs and advocacy of patients' and consumers' needs are explored. The course provides students with an understanding of regulatory requirements related to the protection of health information and introduces technical approaches to ensure compliance.

Repeatability: This course may not be repeated for additional credits.

HIM 5128. Health Data: Standards and Interoperability. 3 Credit Hours.
This course provides an introduction to the principles of healthcare interoperability and provides foundation in healthcare standardization related to: privacy, security, clinical vocabularies, data messaging, architectural framework, data content, and the meaningful use of electronic health record systems (EHRs). The course explores the role of healthcare standards in supporting interoperability, patient care, research, and the practice of evidence-based medicine. National and international standards development efforts are also discussed.

Repeatability: This course may not be repeated for additional credits.

HIM 5129. Health Data Analysis. 3 Credit Hours.
Healthcare delivery systems require capabilities to effectively generate, aggregate, and analyze data relevant to the optimal delivery of healthcare and maintenance of health. This course is intended to build on the competencies gained in previous courses surrounding the creation, structure and maintenance of clinical datasets, patient generated health data, and elements of the digital medical record. The course is designed to embrace team based approaches to solving complex issues in the healthcare delivery system. Students will use data visualization tools paired with quantitative data driven techniques which aid in addressing the challenges in the Triple Aim in healthcare. This course will enable the student to build a basic working knowledge of data analysis, dash boarding, and clinical intelligence platforms using appropriate methodologies.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of B- in (HIM 8013 or HIM 5113)

HIM 5190. Special Topics. 3 Credit Hours.
This course provides students the opportunity to explore new and emerging areas in the field of health informatics, to gain a deeper understanding of a specific area within the field. This course may also be used to present areas of study not normally taught in the program.

Repeatability: This course may be repeated for additional credit.

HIM 5212. Application Development in Public Health. 3 Credit Hours.
This course provides an in-depth understanding of the design and decision making processes for health informatics systems. Students will gain an understanding of the technical foundations required for the successful management of health informatics systems and the impact of adopting initiatives relative to an organization's operational and strategic goals. Students gain an exposure to industry benchmarking and appropriately valuing technology in healthcare along with current software development life cycle methodologies. Topics related to the use of IT as a strategic resource, forming strategic health IT plans, the importance of stakeholders in health IT programs, collection and documenting user stories, developing design documents, and building solutions and emerging healthcare technologies are explored. Students will collaborate in teams to complete a pragmatic, real world project.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of B- in HIM 5101 and HIM 5102.

HIM 5213. Informatics Solution Design and Development for Health Data and Its Applications. 3 Credit Hours.
This course provides an in-depth understanding of the processes and tools used in health informatics for designing and developing advanced health informatics data solutions. This course prepares students to design and develop health specific solutions and applications using current health data models including star schemas, the Observational Health Data Sciences and Informatics (OHDSI), and the Observational Medical Outcomes Partnership (OMOP) common data models (CDM), with clinical, administrative, and social determinants of health data. Relational databases, graph databases, GIS systems, and other NoSQL databases will be used for development from Health Informatics use cases. Students are expected to be able to create health specific informatics solutions and applications, such as those used for clinical data research networks and patient cohort discovery tools.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of B- in HIM 5101 and (HIM 5113 or CIS 5002)

HIM 5256. Global Health Informatics. 3 Credit Hours.
Health and diseases have no country boundaries. Increased international travel has increased the spread of infectious disease, as evidenced by the Ebola virus and COVID-19 pandemics. Health Information Technology, particularly with the spread of mobile phones, brings new paradigms in tracking and battling diseases globally. This course will explore how global health informatics (GHI) combat diseases and promote health, especially in low- and middle-income countries (LMICs). The topics cover key concepts, frameworks, examples, and lessons learned in designing and implementing digital health systems in the developing world. Students will learn informatics innovations in global health, focusing on technologies to improve developing countries' health outcomes. It targets students interested in designing or implementing a GHI solution in LMICs with a multidisciplinary team. Note: The prerequisite is a minimum grade of B- in HIM 5101 or with Program Director approval based on equivalent experience or education.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of B- in HIM 5101.

HIM 5299. Introduction to Language Processing and Text Mining for Health Professionals. 3 Credit Hours.
This course provides a basic understanding of natural language processing (NLP) concepts in healthcare using Python programming language. This course is designed for students with a health background who do not have a basic knowledge of the NLP concepts. There is a vast amount of free-text data getting generated every day, such as social media, online chat groups, research publications, and electronic health record data. This data possesses excellent potential to be used for research, quality improvement, and financial purposes. In this class, students will learn the basic and advanced NLP and text-mining methods to extract information from free-text data to generate new knowledge. Students will also learn basic machine learning principles to mine free-text data that does not require to develop complex NLP pipelines. By the end of this course, students will be able to create NLP programs using concepts such as data segmentation, tokenization, text annotations, NLP parsing, part of speech tagging, developing and testing Named Entity Recognition (NER) programs, pattern recognition, and regular expressions. Students will also learn the use of WEKA, an open-source machine learning tool to mine free-text data to extract information automatically using various machine learning models.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of B- in HIM 5102.

HIM 8016. Principles and Practices of Health Informatics Research. 3 Credit Hours.
As the healthcare system moves toward increased reliance on automation, electronic health records, and information technology, it is imperative to design health informatics research methods to deliver quality, cost-effective and safe healthcare. This course will address the various research practices and innovative research approaches in health informatics and HIM. It will introduce the theories, systems, applications, and technologies for collecting, using and disseminating health data and information. It involves utilizing primary and secondary analysis for direct patient care, reimbursement, patient safety, legal issues, healthcare policy, quality improvement, and public health. Students will learn through discipline-specific examples, step-by-step research design, and explanations of analytical procedures. Upon completing the class, students will be able to conduct quality health informatics research in addressing various informatics-related questions and knowledge discovery from health data.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of B- in HIM 5129.

HIM 8112. Advanced Clinical Decision Support Systems. 3 Credit Hours.
Clinical decision support systems (CDSS) are computer-based programs that analyze data within electronic health records (EHRs) to provide prompts and reminders to assist health care providers in implementing evidence-based clinical guidelines at the point of care. This course provides a state-of-the-science overview of computer-based CDSS. This course will teach the design principles behind CDSS, CDSS usability and cognitive support, implementation science, mathematical foundations of the knowledge-based systems and pattern recognition systems, clinical vocabularies, legal and ethical issues, patient centered CDSS, and applications of clinical decision support systems in clinical practice.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of B- in HIM 5102.

HIM 8129. Advanced Health Data Analytics. 3 Credit Hours.
Healthcare delivery systems require capabilities to effectively generate, aggregate, and analyze data relevant to the optimal delivery of healthcare and maintenance of health. This course is intended to enhance existing competencies for the creation, structure and maintenance of clinical datasets, patient generated health data, and elements of the digital medical record. The course is designed to embrace team science approaches to solving complex issues in the healthcare delivery system. Students will use data visualization tools paired with advanced quantitative data driven techniques which aid in addressing the challenges in the Triple Aim in healthcare. This course will enable the student to build a research based working knowledge of data analysis, dashboarding, and clinical intelligence platforms using appropriate methodologies.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of B- in HIM 5101 and HIM 5102.

HIM 8216. Applications of Machine Learning for Health Informatics. 3 Credit Hours.
The use of machine learning (ML) and artificial intelligence (AI) in healthcare is a must nowadays to enable successful solutions for better patient care. The future of health becomes data-driven. There is an urgent need for a new kind of workforce embracing human intelligence with machine learning skills to solve complex problems from health informatics. This course will integrate problem-based learning (PBL) and research-based teaching (RBT) approaches to apply ML methods and tools for complex real-world health problems. One example is creating intelligent clinical decision support systems for the early diagnosis of neurodegenerative diseases. Students will practice ML on electronic health records (EHR), medical claims, and social media data in healthcare. Upon completing the class, students will be able to identify suitable machine learning approaches and existing tools for a health problem based on the available data variables and records. Note: Students must complete HIM 5102 or equivalent computing experience (with instructor approval) before registering for HIM 8216.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of B- in HIM 5102.

HIM 9082. Independent Study in Health Informatics. 1 to 3 Credit Hour.
This course provides students the opportunity to work independently under the direction of a faculty advisor to gain a deeper understanding of an area in Health Informatics.

Repeatability: This course may be repeated for additional credit.

HIM 9994. Health Informatics Preliminary Examinations. 1 Credit Hour.
This course supports preparation for taking the preliminary examinations in the Health Informatics Ph.D. program. To enroll, students must have completed all required coursework for the Ph.D. and obtain the approval of the Ph.D. Program Director. Students must be enrolled to take the required preliminary examinations.

Repeatability: This course may be repeated for additional credit.

Pre-requisites: Minimum grade of B- in HIM 5212, HIM 5299, HIM 8112, HIM 8129, HIM 8216, EPBI 8012, EPBI 8212, and (HPM 8013 or HIM 8016)

HIM 9995. Capstone Project. 3 Credit Hours.
The capstone course is the culminating class for students in the Health Informatics program. Students will create strategies and approaches that focus on various disciplines of health informatics such as topics relating to the Electronic Health Record, Health Information Exchange, Meaningful Use, and Ethical/Legal issues. In addition, students will analyze systems and evaluate potential decisions from the persona of senior level healthcare executives.

Repeatability: This course may be repeated for additional credit.

Pre-requisites: Minimum grade of B- in HIM 5101, HIM 5113, and HIM 5128 (may be taken concurrently)

HIM 9996. Health Informatics Thesis. 1 to 3 Credit Hour.
The MS health informatics thesis is the culminating event for the Thesis Track. The thesis should be an original piece of research. Often, but not always, the research described in the MS thesis can be published in a peer-reviewed journal. The student coordinates the time for the defense and presentation with their Graduate Advisory Committee, which is responsible for evaluating the thesis and its defense.

Repeatability: This course may be repeated for additional credit.

Pre-requisites: Minimum grade of B- in HIM 5101, HIM 5102, HIM 5113, HIM 5129, HIM 5128, and (HIM 8016 or HIM 8013)

HIM 9998. Dissertation Proposal Research for Health Informatics. 1 Credit Hour.
After passing the preliminary examinations, students may enroll in HIM 9998. Students must be enrolled for 1 credit of HIM 9998 each term until they file their dissertation proposal with the Graduate School. To fulfill the requirements of HIM 9998, students must submit a dissertation proposal, successfully defend it orally before their Committee, apply for IRB approval for the proposed research, and submit the proposal to the Graduate School. Once the proposal is defended, the student is elevated to candidacy and eligible to register for dissertation credits.

Repeatability: This course may be repeated for additional credit.

Pre-requisites: Minimum grade of P in HIM 9994.

HIM 9999. Health Informatics Dissertation Research. 1 to 6 Credit Hour.
This course is limited to PhD candidates who have completed and defended a dissertation proposal that is filed with the Graduate School by the last day to add a course in the semester. Continuous registration in 9999 fall and spring is required until the dissertation is successfully defended.

Repeatability: This course may be repeated for additional credit.

Pre-requisites: Minimum grade of P in HIM 9998.