

Health Management and Informatics (HMI)

HMI 4001: Topics in Health Management and Informatics

Organized study of selected topics. Subjects will vary from semester to semester. May be repeated for credit with departmental consent.

Credit Hours: 3

Prerequisites: department consent

HMI 4420: Fundamentals of Bioinformatics

(cross-leveled with HMI 7420). The purpose of this course is to provide perspective on the fundamentals of exploration of biological knowledge using computers. As technologies such as microarray, sequencing, and biomarkers become more pervasive, they are impacting not only the development of science, but also domains such as health care, nutrition, and ethics. This course provides a description of fundamental bioinformatics concepts such as sequencing, proteomics, metabolomics, and biological pathways, and illustrates them with short informatics experiments. Mainly online resources will be used, so no programming is necessary. Also, the course includes a short primer of molecular biology, so background in molecular biology is not required.

Credit Hours: 3

Prerequisites: Departmental consent required

HMI 4430: Introduction to Health Informatics

(cross-leveled with HMI 7430). Introduction to the use of clinical information systems in healthcare. Topics include clinical data, standards, electronic medical records, computerized provider order entry, decision support, telemedicine, and consumer applications.

Credit Hours: 3

Prerequisites: departmental consent

HMI 4431: Foundation of Public Health Informatics

(cross-leveled with HMI 7431). This course will cover foundational knowledge relevant to Public Health Informatics (PHI). The purpose of this course is to expose students to emerging research and application areas in the field of PHI. It will enhance abilities to know when and how to use theories, concepts, and tools of informatics applied to public health. The emphasis of the course is on the use of informatics tools and practices in public health and the existing and evolving relationship between clinical and public health systems. The focus is on PHI including topics such as data exchange and standards, interoperability, use of informatics tools, applying informatics to public health communication and dissemination, surveillance systems, public health policy and project management.

Credit Hours: 3

HMI 4436: Telehealth

(cross-leveled with HMI 7436). This course will cover foundational knowledge of telehealth applications. The purpose of this course is to learn about the overarching types of connected health applications, such as telehealth and telemedicine, describe the clinical practice considerations for virtual care delivery for health professionals and administrators, analyze operational success factors, facilitators and

barriers of telehealth implementation and adoption, discuss practice and policy considerations, and describe different uses and types of telehealth.

Credit Hours: 3

HMI 4440: Health Information Technology

(cross-leveled with HMI 7440). In this course, the student will learn 1) The Python programming language and how to use it for biomedical applications 2) the SQL database language and how to design and operate a database, and 3) HTML and javascript languages and how to design a web application. Applications will be healthcare focused.

Credit Hours: 3

Prerequisites: Departmental consent required

HMI 7001: Topics in Health Management and Informatics

Organized study of selected topics. Subjects will vary from semester to semester. May be repeated for credit with departmental consent.

Credit Hours: 3

HMI 7410: Introduction to the US Health Care System

This is a survey course about the American health system, meant to provide a conceptual foundation for students to think critically about the US health system and to build upon in their future related courses. It includes concepts and language in health care, public health, and personal health and provides an understanding of how these domains of health interrelate. Particular focus is given to health care delivery, including how health care services are organized, delivered, paid for, and measured. Selected key, forward-looking issues are covered. The roles of management, leadership, and physicians are highlighted. A resource bank and regular flow of good information sources is developed. Business writing skills are emphasized.

Credit Hours: 3

HMI 7420: Fundamentals of Bioinformatics

(cross-leveled with HMI 4420). The purpose of this course is to provide perspective on the fundamentals of exploration of biological knowledge using computers. As technologies such as microarray, sequencing, and biomarkers become more pervasive, they are impacting not only the development of science, but also domains such as health care, nutrition, and ethics. This course provides a description of fundamental bioinformatics concepts such as sequencing, proteomics, metabolomics, and biological pathways, and illustrates them with short informatics experiments. Mainly online resources will be used, so no programming is necessary. Also, the course includes a short primer of molecular biology, so background in molecular biology is not required.

Credit Hours: 3

Prerequisites: Open to undergraduates with dual enrollment

HMI 7430: Introduction to Health Informatics

Introduction to the use of clinical information systems in healthcare. Topics include clinical data, standards, electronic medical records, computerized provider order entry, decision support, telemedicine, and consumer applications.

Credit Hours: 3

Prerequisites: departmental consent

HMI 7431: Foundation of Public Health Informatics

This course will cover foundational knowledge relevant to Public Health Informatics (PHI). The purpose of this course is to expose students to emerging research and application areas in the field of PHI. It will enhance abilities to know when and how to use theories, concepts, and tools of informatics applied to public health. The emphasis of the course is on the use of informatics tools and practices in public health and the existing and evolving relationship between clinical and public health systems. The focus is on PHI including topics such as data exchange and standards, interoperability, use of informatics tools, applying informatics to public health communication and dissemination, surveillance systems, public health policy and project management.

Credit Hours: 3

HMI 7432: Health Database Management and Public Health Data Systems

This course will cover foundational knowledge relevant to database management and public health data systems for Public Health Informatics (PHI). The purpose of this course is to provide students with concepts relevant to the effective use of data, information, and knowledge tools to build, manage, merge, retrieve, and analyze public health data from appropriate health data systems. The emphasis of the course is to use, develop and adapt public health information systems as needed to support public health efforts through use of public health informatics tools and practices to support existing and evolving relationships between clinical and public health systems. The focus is to plan, develop, implement, manage and evaluate database management systems and health data systems that meet the needs of public health practice through PHI.

Credit Hours: 3

HMI 7435: Scripting for Public Health Informatics

In this online course, the student will learn 1) the Python programming language and how to use it to manipulate common forms of public health data, 2) the SQL language and how to design and interact with a relational database and its contents.

Credit Hours: 3

Prerequisites: College-level Statistics; Graduate standing or permission of the instructor

HMI 7436: Telehealth

(cross-leveled with HMI 4436). This course will cover foundational knowledge of telehealth applications. The purpose of this course is to learn about the overarching types of connected health applications, such as telehealth and telemedicine, describe the clinical practice considerations for virtual care delivery for health professionals and administrators, analyze operational success factors, facilitators and barriers of telehealth implementation and adoption, discuss practice and policy considerations, and describe different uses and types of telehealth.

Credit Hours: 3

HMI 7440: Health Information Technology

(cross-leveled with HMI 4440). In this course, the student will learn 1) The Python programming language and how to use it for biomedical applications 2) the SQL database language and how to design and operate a database, and 3) HTML and javascript languages and how to design a web application. Applications will be healthcare focused.

Credit Hours: 3

Prerequisites: college algebra and statistics

HMI 7445: Data Science in Healthcare

Data science is an emerging field that involves using automated techniques to extract insights from structured and unstructured data. This course introduces data science concepts, techniques, and tools for solving data-driven challenges in healthcare. Data wrangling concepts on health care data will be discussed. Machine learning techniques for extracting insights from healthcare data will be covered including classification, regression, and clustering techniques. Natural language processing (NLP) techniques on unstructured healthcare data will be discussed. Tools for visualization of insights gained from healthcare data will also be discussed. A student will gain hands on skills in using open-source data science tools and libraries. Programming assignments will be done in Python.

Credit Hours: 3

Prerequisites: HMI 7440 or permission of instructor

HMI 7471: Introduction to Accounting and Finance in Health Care

This course introduces the current financial environment in which providers operate and the fundamentals of financial accounting, with an emphasis on accounting and financial management principles and concepts that are critical to decision making for department-level management of health services organizations. This course provides the foundation for the second healthcare financial management course offered in the second year of this program.

Credit Hours: 3

Prerequisites: Graduate standing or consent of instructor

HMI 7564: Health Ethics Theory

An introduction to health ethics theory and methodology. We discuss metaethics and normative ethics theories, normative ethics in health ethics and methods of ethics case work up.

Credit Hours: 3

HMI 7566: Health Informatics Ethics

An introduction to how the increasing use of distance-based technologies, computers, and online communications may impact the ethical delivery of health care. Examples of questions to be addressed: Is it possible that the increasing use of computers in healthcare has made things worse? How should HIPAA be interpreted and why is there such confusion about it? Should patients be able to "post" negative comments about providers on social media sites? What should be done about the increasing amounts of personal information healthcare corporations are collecting on patients?

Credit Hours: 3

HMI 7567: Health Organizational Ethics

Examples of questions to be addressed: Should hospitals and doctors try to maximize profits? Do providers have a moral obligation to serve people who cannot pay? Is it okay to deceive an insurance company if it means better patient care? What should employees do if their employer is committing fraud? Is it ethical for hospitals to drug-test employees and investigate their private lives? What is the ethical way to hire and fire healthcare staff? What should you do if your supervisor is evil?

Credit Hours: 3

Prerequisites: HMI 7564 or equivalent course, or permission of instructor

HMI 7580: Project Management

This course is designed to provide an in-depth understanding of the fundamentals of project management and its application to the provision of health care. A problem-based approach is used to frame both the theoretical underpinnings of project management and hands-on practical application. Students will develop an understanding of the foundations of project management designed to enable them to successfully complete the certification exam to become a certified project manager. Course content includes project scope development, project work breakdown, financial control, and human resources management for projects.

Credit Hours: 3

HMI 7880: Agile Project Management in Healthcare

Overview of the theory and methods associated with agile project management within the context of healthcare operations. Focus of the course is on knowledge of agile principles and agile techniques and the use of appropriate analysis tools. Course encompasses many approaches to agile project management including Scrum, Kanban, Lean, extreme programming (XP) and test driven development (TDD), and appropriate construction and management of information projects that are supportive of best practice clinical, administrative, and strategic policy and procedure in the delivery of health. A problem-based approach is used to provide the basis for addressing issues and solutions specific to the health delivery environment. Graded on A-F basis only.

Credit Hours: 3

Prerequisites: HMI 7580 or permission of instructor

HMI 8090: Thesis Research in Health Management and Informatics

Research leading to a thesis. May be repeated to maximum of 9 hours. Graded on S/U basis only.

Credit Hour: 1-6

Prerequisites: Advisor's consent

HMI 8401: Topics in Health Management and Informatics

Organized study of selected topics. Subjects will vary from semester to semester. May be repeated for credit with departmental consent.

Credit Hours: 3

HMI 8435: Information Security, Evaluation and Policy

The purpose of this course is to provide an extensive overview, practical applications and analyses of functionality and usability evaluations of health care information technology, and to discuss the impact of security on the present and future health care settings.

Credit Hours: 3

HMI 8437: Data Warehousing and Data/Text Mining for Health Care

An introduction to the basic concepts of data warehouse and data/text mining, creating an understanding of why we need those technologies and how they can be applied to healthcare problems.

Credit Hours: 3

Prerequisites: HMI 8441

HMI 8441: Biomedical and Health Vocabularies and Ontologies

Basic and advanced concepts of controlled terminologies and their use in the representation of biomedical information and knowledge, with emphasis on terminology management in the health care enterprise. Syntactic and semantic structure of controlled terminologies are examined and a number of representative terminologies are analyzed.

Credit Hours: 3

HMI 8443: Enterprise Information and Solutions Architecture for Strategic Healthcare Operations

Organization and development of infrastructure necessary to support an enterprise information system for patient care. Components of architecture are introduced in a problem-based approach, case examples are presented as the basis for addressing specific attributes of the components, as well as problems facing the design of an enterprise information system for health care.

Credit Hours: 3

HMI 8450: Methods of Health Services Research

Writing intensive course provides students with basic understanding of literature search, experimental designs, evaluation methods, ethics, reporting and application of health services research. Practical research problems are discussed and students prepare a professional, managerially relevant research proposal.

Credit Hours: 3

Prerequisites: HMI 7410; Satisfactory completion of a college-level course in statistics

HMI 8451: Individual Executive Management Studies

Students will investigate and address important issues in their organizations. Students will use scientific evidence and techniques to solve applied problems. They will develop data collection protocols, collect and analyze data, draw conclusions, and develop recommendations using basic research methods tools. They will provide actionable and feasible recommendations based on their analysis. Graded on S/U basis only.

Credit Hours: 3

Prerequisites: HMI 7410, HMI 8450 or permission of instructor

HMI 8453: Executive Management Studies

Students will use scientific evidence and techniques to solve applied problems in health care organizations. Students will serve as professional consultants, working within small teams to develop project specifications and plans in collaboration with their clients. They will develop data collection protocols, collect and analyze data, draw conclusions and develop recommendations using basic research methods tools. They will provide actionable, feasible recommendations to their clients based on their analysis. Graded on A/F basis only.

Credit Hours: 3

Prerequisites: HMI 7410; Graduate standing or permission of the instructor

HMI 8460: Administration of Health Care Organizations

Analyzes health care organizations, emphasizing organizational structure, and strategy, and managerial leadership. Topics include governance,

adaptation, design, interorganizational networks, and organizational performance.

Credit Hours: 3

HMI 8461: Managing Human Resources in Health Care Organizations

Provides a framework for understanding and thinking strategically about employee relations and management of people in organizations, drawing on insights from social sciences to explore how psychological, economic, social, and cultural forces influence human resources management in health care.

Credit Hours: 3

HMI 8470: Strategic Planning and Marketing for Health Care Organizations

Analysis of strategic planning and services management and marketing concepts, techniques, and tools in the health care industry. Includes analyzing the environment, assessing the organization's strengths and weaknesses, formulating strategy to achieve competitive advantage, and implementing strategy through service management and marketing.

Credit Hours: 3

Prerequisites: HMI 7410, and HMI 8524

HMI 8472: Financial Management for Health Care Organizations

Application of concepts, tools and techniques of financial management and their interrelationships as they apply to current and future operation of health care organizations.

Credit Hours: 3

Prerequisites: For Residential students - HMI 7410, HMI 7471, HMI 8460, HMI 8524. For Executive students - HMI 7410, HMI 8460, HMI 8524, and satisfactory completion of college-level courses in managerial accounting and financial management or satisfactory completion of HMI's online accounting and finance module

HMI 8478: Knowledge Management in Health Care

Representing clinical terms, concepts and knowledge in a form for manipulation by intelligent systems. Theoretical formalisms and conceptual representations of medical information. Examination of knowledge engineering tools and decision support systems.

Credit Hours: 3

HMI 8485: Problems in Health Management and Informatics

Intensive study of an area of health services management.

Credit Hour: 1-6

Prerequisites: instructor's consent

HMI 8515: Problems in Medical Ethics and Clinical Ethics Consultation Practicum

The Problems in Medical Ethics Course is a practicum based course with a hands-on clinical ethics consultation component. The course will provide the student with a tailored learning experience that will encourage and develop skills and a working knowledge about health care ethics, and the ability to respond effectively when confronted with the difficult ethical dilemmas that may be encountered at multiple levels in the complex arena of health care. Specifically students will cultivate skills which will optimize their ability to work as an ethics consultant in a multidimensional

and diverse society as well as an inclusive health care environment. The course is designed with flexibility in mind, however there are mandatory onsite components which will require the student to attend structured meetings, consultations and presentations.

Credit Hours: 5

Prerequisites: M-4 status for medical students. For Graduate students, HMI 7564 - Health Ethics Theory and HMI 8565 - Health Care Ethics and permission of instructor

HMI 8524: Health Economics

Building upon previous knowledge of basic economic theories, concepts, and tools, the structure, organization, activities, functions, and problems of health and medical care are considered from an economics perspective.

Credit Hours: 3

Prerequisites: microeconomics

HMI 8544: Managerial Epidemiology (Population Health Management)

Examination of basic epidemiological concepts and methods as they apply to health services management. Lectures and discussions focus on the most useful measures of occurrence of health events, methods of data collection, research study design, the interpretation of epidemiological data, and the limitations of epidemiological methods, providing the background needed by students to critically review, draw conclusions from, and use information encountered in their roles as healthcare managers. Emphasis is placed on practical applications of epidemiology to health services planning, problem solving, policy development, and systems-thinking.

Credit Hours: 3

Prerequisites: Restricted to HMI students only

HMI 8545: Methods in Public Health Informatics

This course will cover foundational statistical knowledge and methods relevant to Public Health Informatics (PHI). The purpose of this course is to teach students to identify and perform appropriate statistical methods for the data analysis of data from many commonly used experimental designs in the field of PHI. The emphasis of the course is on the understanding of theoretical assumptions underlying these statistical methods. The focus of this course is to perform selected statistical analyses using, SPSS and/or R and to interpret statistical results, in a manner relevant to public health informatics in the context of public health. This course builds upon previous knowledge of basic statistics, concepts, and tools by applying them specifically to the public health field.

Credit Hours: 3

Recommended: college algebra

HMI 8546: Public Health Information and Visualization (GIS) in Public Health

This course will cover foundational knowledge of Geographic Information Systems (GIS) relevant to Public Health Informatics (PHI). The purpose of this course is to learn basic descriptive and analytical functions of GIS for research and application areas in the field of PHI. The course emphasis is for students to gain hands-on experience in the use of GIS, mapping, and spatial data analysis software such as ArcGIS, R, and Instant Atlas. The focus is on the use of geographic information systems

(GISs) in the analysis of public health data. No previous knowledge of mapping or GIS is required, but one is expected to have a working knowledge of MS Office, Windows operating systems, and Biostatistics (prerequisites Methods in Public Health Informatics/Biostatistics). This course builds upon previous knowledge of basic statistics, concepts, and tools by applying them in a GIS context specific to Public Health Informatics.

Credit Hours: 3

Prerequisites: HMI 8545

HMI 8550: Health Data Analytics

The purpose of this course is to provide you with an applied approach to analyze healthcare data. It will enhance abilities to know when and how to use theories, concepts, and tools of data analysis and statistics to evaluate and analyze health care data systematically. The emphasis of the course is on the use of data analysis in the health care field. The focus is on applying data analysis to health care data, problems and issues in the health care system, and on the data application necessary to make decisions based on the analysis. This course builds upon previous knowledge of basic statistics and analytics, concepts, and tools by applying them specifically to the health care system.

Credit Hours: 3

Prerequisites: college algebra and statistics or permission of instructor

HMI 8565: Health Care Ethics

Explores ethics issues and controversies facing clinicians and healthcare administrators. Topics may include end-of-life care, imperiled newborns, maternal-fetal conflict, procreative liberty, genetic screening and enhancement, organ procurement and allocation, rationing, public health, workplace relationships, and conflicts of interest.

Credit Hours: 3

HMI 8571: Decision Support in Health Care Systems

Applies principles and techniques of computer-assisted decision making to solve health care problems. Clinical and managerial applications of artificial intelligence, including expert systems reviewed. Advantages of integrating decision support programs with databases are discussed.

Credit Hours: 3

HMI 8573: Decision Making for Health Care Organizations

Applies and integrates data and decision making techniques with process analytic and improvement tools and techniques. Also includes applications of spread sheets and relational databases in healthcare settings.

Credit Hours: 3

Prerequisites: Restricted to HMI students

HMI 8574: Health Care Law

Survey of the function and methods of law as applied to health care administration and health care.

Credit Hours: 3

Prerequisites: HMI 7410, HMI 7471, HMI 8460, HMI 8524. Non HMI students with a Graduate or professional school career may be able to take the course with instructor consent

HMI 8575: Health Policy and Politics

Overview and critical analysis of health policy issues in the United States, including how the dynamics of the policy making process have shaped outcomes, successful and unsuccessful, of a number of important policy initiatives.

Credit Hours: 3

HMI 8610: Consumer Health Informatics

Consumer health informatics explores the branch of medical informatics that analyzes consumers' needs for information; studies and implements methods of making information accessible to consumers; and models and integrates consumers' preferences into medical information systems.

Credit Hours: 3

Prerequisites: Graduate standing or permission of the instructor

HMI 8689: Field Experience in Health Management and Informatics

Supervised field experience in approved health agencies and institutions. Opportunity for observation and service participation in various fields of health. Graded on an A-F basis only.

Credit Hours: 3

HMI 8810: Research Methods in Informatics

Research Methods in Health and Bioinformatics is a writing intensive course that provides students with an understanding of research proposal development, literature searching, research synthesis, research designs, evaluation methods, and ethics. Graded on A-F basis only.

Credit Hours: 3

Prerequisites: Second semester or later in PhD program or instructor's consent

HMI 8870: Knowledge Representation in Biology and Medicine

The main topics presented in the course are: logic systems, knowledge representation methods, production systems and representation of statistical and uncertain knowledge. Graded on A-F basis only.

Credit Hours: 3

Prerequisites: HMI 7430 and HMI 7440
