ME.250 (HEALTH SCIENCES INFORMATICS)

ME.250.651.  Topics in Interdisciplinary Medicine - Clinical Informatics.  0 Credits.

ME.250.750.  Health Information Systems: Design to Deployment.  3 Credits.

ME.250.755.  Natural Language Processing in the Health Sciences.  3 Credits.

There is significant demand in both academia, research and industry for informatics professionals who are well versed in natural language processing (NLP). In this course, students will be oriented to the various applications of NLP in biomedicine, healthcare and public health. The course will emphasize the importance of clearly defining what problem needs to be solved or what questions one seeks to get answered via the use of NLP. Approaches to data mining of free text from the biomedical literature, clinical narratives, and other novel data sources will be covered. There will be opportunities for students to develop NLP and machine learning algorithms. Applications of these tools in epidemiologic surveillance, clinical decision support, and other relevant use cases will be covered.

ME.250.756.  Informatics and the Clinical Research Lifecycle: Tools, Techniques and Processes.  3 Credits.

Research informatics deals with how informatics can and should support research and how research is altered by that support. The course addresses the entire life cycle of a clinical-research program: idea generation, team building, protocol development, obtaining funding, addressing ethical concerns, obtaining permissions, recruiting participants, providing the intervention and associated care, data collection, data analysis, data archiving, and results dissemination. The course addresses the related topic of translational informatics, incorporating the results of clinical and bioinformatics research into health practice. In each case, the course will highlight novel principles involved, tools available, evidence for their success, and implications for the future.

ME.250.770.  Clinical Data Analysis with Python.  3 Credits.

This course introduces the knowledge of Object Oriented Programming and Python programming language. Covers Python data structures and practical data analysis skills in a clinical informatics context. Presents methods for data manipulation, data cleaning, and data visualization using Python Pandas, Numpy, and Matplotlib libraries. Discusses basic statistical analyses methods in the healthcare setting.

ME.250.771.  Introduction to Precision Medicine Data Analysis.  3 Credits.

This course will introduce students to the rapidly evolving field of precision medicine and the role of big data analytics in improving patient care, clinical decision making, and population health management. The course will provide an overview of the array of different tools that can be used by data scientists and clinical informaticians in a secure research environment.

ME.250.775.  Advanced informatics Elective: Informatics Education.  2 Credits.

This practicum is intended to provide senior graduate students with experience in curriculum design, teaching, and pedagogy in the field of informatics. Students will be introduced to the CAHIIM accreditation standards and AMIA competencies around health informatics.

ME.250.776.  Advanced informatics Elective: Telemedicine.  2 Credits.

This practicum is intended to provide senior students in the Informatics Education Program with experience in the field of telemedicine. Experiences may include exposure to clinical workflows, strategic planning around technology, reimbursement/policy, elements of data collection, and other essential concepts.

ME.250.777.  Clinical Decision Analysis.  2 Credits.

This advanced elective introduces students to the basic theory and practice of decision analysis as applied to the clinical context, with an eye towards clinical decision support and the place of decision modeling in the informatics context. Topics include: articulating and structuring in decision trees, creating a decision model, skill building in decision trees, and exposure to Markov models and discrete event simulation.

ME.250.778.  Implementing Fast Healthcare Interoperability Resources.  2.5 Credits.

Fast Healthcare Interoperability Resources (FHIR) is transforming healthcare with an open-web services’ standards approach to clinical integration. This course is a hands-on experience working on integrating digital health and clinical systems interoperability.

ME.250.779.  Advanced Elective in Precision Medicine.  2 Credits.

This elective option is with the Biomedical Informatics and Data Science education program. It is intended for graduate students in the Certificate or Masters programs with an interest in exploring advanced topics on precision medicine analytics. Students will have access to the Precision Medicine Analytics Platform (PMAP) and focus on a specific topic of interest. These topics may include: artificial intelligence, machine learning, common data models, fast healthcare interoperability resources, and the programming languages Python and Structured Query Language (SQL).

ME.250.781.  Data Driven Digital Health Entrepreneurship.  1 Credit.

This seminar is for graduate students with an interest in digital health innovation who want to explore pathways to entrepreneurship. We are in the midst of a revolution in digital health with the widespread adoption of electronic medical records and increasing adoption of wearable fitness and health tracking devices. Maturing big data analytics, artificial intelligence and clinical decision support tools allow for rapid deployment of innovations. Although we now have the ability to derive insights from text, data and images spanning petabytes of data, learners in this course will have the opportunity to carefully define what the exact healthcare problem is that any particular solution is looking to solve. They will hear from experts in the field about features of digital health solutions that can be used to solve problems. Students will explore the advantages, disadvantages and value proposition for various digital health solutions and the associated market opportunities.

ME.250.782.  Observational Health Research Methods on Medical Records.  3 Credits.

This course provides practical experience working with the OMOP common data model (CDM) from the Observational Health Data Science and Informatics (OHDSI) community. The class will provide students with an understanding of the research challenges posed by traditional healthcare data sources and will highlight the importance of the standardized data model. Students will gain familiarity with tools for cohort discovery such as Athena and Atlas.
ME.250.854. Health Sciences Informatics Mentored Research. 3 Credits.
This course number applies to Research Masters students and both lab rotations for PhD students and to continuing research for PhD students. The informatics research is precepted by a faculty member in the Division or approved by the Training Program Director. The research may originate with the preceptor or with the student, and may be different phases of development. In the case of the lab rotation, most of the activity is supervised by the preceptor. In the case ongoing research, there is supervision by the Training Program Director as well as the research committee assembled by the student. Milestones are set for each quarter. Please note that a comprehensive research plan must by submitted to the program director for approval no later than September 15 of Year 2. Failure to do so will result in probation for the student.

ME.250.855. Health Sciences Informatics Technology Practicum. 3 Credits.
A practical experience supervised by Hopkins faculty that enables students to showcase and develop skills gained during the didactic curriculum. In correct with a preceptor and an academic advisor, students articulate a concrete deliverable and work with the preceptor and their team to accomplish the deliverable. Example activities include, but are not limited to, literature review, systems analysis, systems evaluations, data analysis, or plans for any of these.

ME.250.856. Health Sciences Informatics Independent Study. 3 Credits.
Independent study courses must be approved by the Program Director. Please note that it is important to follow the steps outlined below in order to comply with BIDS/SOM registration and grading policies. Students submit a course description to the Training Program Director. Course Instructor and Program Coordinator. The description will include the length of Independent Study (up to 2 quarters or 1 semester), the time commitment (given in hours per week or quarter), the student’s goals and what the deliverable will be. On approval by the Program Director, the Coordinator will supply you with the appropriate course number for registration. It is important that the course instructor be prepared to submit a letter grade on their department letterhead to the Program Coordinator.

ME.250.858. Capstone. 8 Credits.
The Capstone Project will generally last 2 quarters. Students will join an active work group, supervised directly or indirectly by the practicum preceptor.

ME.250.859. Informatics PhD Research. 1.5 Credits.
After selecting a laboratory for their thesis, the student will establish a research plan with their faculty advisor.

ME.250.860. Student Seminar and Grand Rounds. 1 Credit.
Weekly combined seminar and Grand Rounds during term. Students not matriculated in our formal degree or certificate program must seek the instructor’s permission. Grand Rounds is open to all for those not seeking course credit for attending.

ME.250.901. HSI: Knowledge Engineering and Decision Support. 3 Credits.
This course provides a framework for understanding decision support in the workflow of the health sciences. The focus is on the types of support needed by decision makers, and the features associated with those types of support. A variety of decision support algorithms are discussed, examining advantages and disadvantages of each, with a strong emphasis on decision analysis as the basic science of decision making. Students are expected to demonstrate facility with one algorithm in particular through the creation of a working prototype, and to articulate the evidence and effectiveness of various types of decision support in health sciences and practice, in general.

ME.250.952. Leading Change Through Health IT. 3 Credits.
Prepares learners to lead organizations implementing new IT systems. Covers the knowledge and skills that enable clinical and public health informaticians to lead and manage changes associated with implementation, adoption, and evaluation of effective use of health information systems. The course covers the following topics: Leadership & governance in Health IT, Project Management, Strategic Planning for Health Information Systems, Workflow Re-engineering and Change Management.

ME.250.953. Introduction to Public Health and Biomedical Informatics. 3 Credits.
Introduces students to the core principles of informatics as applied to the entire range of health, from prevention, through illness, to population and public health. Focuses on frameworks within which to describe and explain health information systems. Provides to non-clinicians basic exposure to the terminology of clinical care and public health. Provides to technical novices of basic exposure to IT terminology. Provides all students entry-level concepts and skills for later courses in the informatics sequences.

ME.250.954. HIT Standards and Systems Interoperability. 3 Credits.
The purpose of this course is to learn the data, information and knowledge standards critical to the successful implementation of local, regional and national health-related information systems. Target competencies are to identify the appropriate level of HITSP standards for an informatics problem, and select the appropriate standard within that level: create use cases and an organizational process to define an interoperability standard for a specific healthcare/regional situation; participate in a national standards-creation process.

ME.250.955. Applied Clinical Informatics. 3 Credits.
This course introduces students to the field of Applied Clinical Informatics, which is focused on improving patient care through enhanced use of clinical information systems. Students will be exposed to a wide range of clinical workflows and how health information technology and systems support them. Topics in the course included: Bar Coding, Clinical Decision Support, Computerized Provider Order Entry, Electronic Health Records, Electronic Prescribing, Health Information Exchange, Master Patient Index, and Telehealth/Telemedicine. Each of these will be examined within the appropriate context of clinical care transitions, patient safety and care quality, inpatient/ambulatory care settings, information security and deployment of HIT.
ME.250.957. Database Querying in Health. 3 Credits.
Through class discussion and interactive Python data exercises, this course provides practical experience working with electronic medical record data. The class will provide students access to the Johns Hopkins Precision Medicine Analytics Platform (PMAP) to conduct analysis on a de-identified EMR dataset of 60K patients with over 100 million data elements. The class will work with Jupyter notebooks to learn how to prepare EMR data and construct models from encounter, symptoms, lab, procedure, vitals and medication data. The topics will include exploratory data analysis, data cleaning, feature extraction, model construction, and evaluation. Working knowledge of SQL is expected and Python encouraged. The class will have access to the PMAP cookbook of Jupyter notebook recipes and Datacamp accounts will be provided for students to master working with major Python libraries Pandas, Matplotlib, Numpy and Sci-kit.