Master's Curriculum for the Health and Clinical Informatics (HCIN) Program

The goal of the curriculum is to produce students capable of assuming appropriate jobs in biomedical informatics in both industry and academia. The Master of Science Thesis (MS) curriculum consists of 55 credit hours, divided between 48 credits of coursework and 12 credits of master's thesis work. The MS Thesis is on-campus only.

The Master of Science Non-Thesis (MS) curriculum consists of 49 credit hours, divided between 43 credits of coursework and 6 credits of capstone project work. Postdocs are automatically admitted to the MS Non-Thesis and complete a publishable manuscript as the final deliverable. OHSU operates on a quarter system, so a full-time student should be able to complete the coursework portion of the program in 7 quarters. Part-time enrollment in the program is allowed. The MS Non-Thesis may be completed on-campus or online.

The required coursework spans five areas (biomedical informatics, healthcare, computer science, evaluative sciences, and organizational behavior and management), each of which has a minimum number of credits as well as required courses. While most courses are taught by biomedical informatics faculty, some are taught in other departments at OHSU and in the OHSU-PSU School of Public Health (SoPH). Additional elective courses are available at Portland State University (PSU).

The five areas of the curriculum and their rationale are as follows:

Biomedical Informatics - Students should have a detailed knowledge of the role of computers and information technology in health and biomedicine.

Healthcare - Students should have a basic understanding of the human body in health and disease as well as the operation of health care systems. Students with a health professional degree (RN, MD, etc.) are exempt from BMI 530 but must take another 3-credit class in its place. All students are required to take one of BMI 536, 537 or 538.

Computer Science - Students should have a basic understanding of computer science in order to understand the role and limitations of computers in health and biomedicine. A three-quarter sequence covers the basics of computer science deemed necessary for a biomedical informatics professional. A prerequisite for admissions is a college-level Computer Programming course taught in Python, C, C++, or Java which must be completed prior to enrolling in the CS courses.

Evaluative Sciences - Students should understand the fundamental aspects of scientific research, including statistics, quantitative and qualitative research methods, epidemiology and health data analysis.

Organizational Behavior and Project Management - Students will gain knowledge and skills in the areas of managing people and projects. This basic understanding is critical for informaticians if they are to succeed in today's changing organizational environments.

Other - A course on scientific writing and communication is required for all informatics students. An ethics course for all graduate students in the School of Medicine is also required. Students entering the program with a previous degree in computer science may petition for exemption from the computer science sequence. Students must follow the guidelines in the CS policy. Students who receive the exemptions are still required to complete 55 credit hours for the MS Thesis and 49 credit hours for the MS Non-Thesis. Up to 20 credits may be transferred into the MS during the first year of the program. Courses applied to a previous degree are not eligible for transfer, though may be waived.

Required Courses in Health and Clinical Informatics Program

All courses are three credits, unless otherwise noted.

1. BIOMEDICAL INFORMATICS (6.0 total credits)
Required course (3.0 credits)
BMI 510 - Introduction to Biomedical Informatics

Individual Competency courses (3.0 credits)
BMI 512 - Clinical Systems
BMI 514 - Information Retrieval
BMI 516 – Standards for Interoperability
BMI 520 - Consumer Health Informatics
BMI 521 - Public Health Informatics

2. HEALTHCARE (6.0 total credits)
Required course (3.0 credits)
BMI 530 - Practice of Health Care

Individual Competency courses (3.0 credits)
BMI 536 – Evidence-based Medicine
BMI 537 – Healthcare Quality
BMI 538 – Medical Decision Making

3. COMPUTER SCIENCE (9.0 total credits)
Required courses (6.0 credits)
BMI 540 - Computer Science and Programming for Clinical Informatics
BMI 544 - Databases

Individual Competency courses (3.0 credits)
BMI 524 – Analytics for Healthcare
BMI 546 – Software Engineering
BMI 548 – Human Computer Interaction in Biomedicine

4. EVALUATIVE SCIENCES (7.0 total credits)
Required course (7.0 credits)
BSTA 525 – Introduction to Biostatistics (4.0)
BMI 560 – Design & Evaluation in Health Informatics (required in MS Non-Thesis only)

Individual Competency courses (3.0 credits)
BMI 561 - Qualitative Research Methods
BMI 562 - Quantitative Research Methods
MS Thesis only. These courses are **Electives** in the MS Non-Thesis.

5. ORGANIZATIONAL BEHAVIOR AND PROJECT MANAGEMENT (6.0 total credits)
Required courses (6.0 credits)
BMI 517 - Organizational Behavior and Management
BMI 518 - Project Management

Elective course
BMI 519 - The Business of Health Care Informatics

6. CAPSTONE/THESIS PREP (6.0 total credits)
BMI 576 – Managing Ethics in Biomedical Informatics
BMI 570 - Scientific Writing and Communication for Informatics Students

7. GRADUATION REQUIREMENTS
BMI 503 - Master's Thesis (12.0 credits)
BMI 581 - Capstone Project (6.0 credits) OR
BMI 590 – Capstone: Internship (6.0 credits)

8. ADDITIONAL ELECTIVES
BMI 501 – Research
BMI 502 – Independent Study
BMI 505 – Reading & Conference
BMI 507 – Seminar
BMI 509 – Practicum
BMI 513 – Electronic Health Record Lab
BMI 523 – Clinical Research Informatics
BMI 533 – Data Harmonization
BMI 569 – Data Analytics
All BMI courses