Twin Cities Campus

Health Informatics M.S.

Health Informatics, AHC Inst

Graduate School

Link to a list of faculty for this program.

Contact Information:
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- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 36
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the General Information section of the catalog website for requirements that apply to all major fields.

Health informatics (also known as biomedical informatics) is an interdisciplinary field of scholarship that applies computer, information, statistical, management, and related scientific methods to enable biomedical discovery and support the effective and efficient use and analysis of data, management of information, and application of knowledge across the spectrum from basic science to clinical care. The ultimate goal of the field is to improve the health, well-being, and economic functioning of society. Students take a sequence of core courses in health informatics, computing, and biostatistics, and electives in technical and health science areas. Possible areas of emphasis include health information systems, telehealth, bioinformatics, user interface design, system impact evaluation, database construction and analysis, clinical decision-making, evaluation of health programs, and physiological monitoring and control.

The health informatics MS is intended for students who are interested in research, but who do not have the background or are not ready to commit to the PhD program.

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.30.

Applicants are expected to have at least a bachelor of science or equivalent degree from a regionally accredited institution of higher education.

Required prerequisites

Health or Biological Sciences

Applicants must have taken 6 semester-credits or 9 quarter-credits at the undergraduate or graduate level in medical, life, or biological sciences from a regionally accredited institution of higher learning or equivalent. This broadly defined requirement includes most courses with a health or biology emphasis, including biostatistics, health services research, and public health, as well as more traditional biology or life science courses.

Programming Language

Documented work or educational experience working with a programming language such as C, C++, Java, Python, R, Visual Basic, etc.
or HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)
or Department Consent

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 151
  - General Test - Quantitative Reasoning: 160
  - General Test - Analytical Writing: 4

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International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to test abbreviations(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

Plan A: Plan A requires 26 major credits, up to null credits outside the major, and 10 thesis credits.The final exam is written and oral.

Plan B: Plan B requires 36 major credits and up to null credits outside the major.The final exam is written and oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Required HINF Courses (16 credits)

All students must take AHC Informatics Grand Rounds (HINF 5436) twice for a total of two credits.
HINF 5430 - Foundations of Health Informatics I (3.0 cr)
HINF 5431 - Foundations of Health Informatics II (3.0 cr)
HINF 5436 - AHC Informatics Grand Rounds (1.0 cr)
HINF 5510 - Applied Health Care Databases: Database Principles and Data Evaluation (3.0 cr)
HINF 5520 - Informatics Methods for Health Care Quality, Outcomes, and Patient Safety (2.0 cr)
HINF 5531 - Health Data Analytics and Data Science (3.0 cr)

Other Required Courses (7 credits)

NURS 5116 - Consumer Health Informatics (2.0 cr)
NURS 7108 - Population Health Informatics (2.0 cr)
PUBH 6450 - Biostatistics I (4.0 cr)

Electives

Plan A students must take at least 3 credits, and Plan B students must take at least 9 credits of electives to meet the 36-credit minimum. If labs or practicums are selected as electives, they must be taken concurrently with the associated course (i.e. take HINF 8430 with HINF 5430). Electives must be approved by the advisor.
BIOC 5361 - Microbial Genomics and Bioinformatics (3.0 cr)
BIOC 8007 - Molecular Biology of the Genome (2.0 cr)
BIOC 8008 - Molecular Biology of the Transcriptome (2.0 cr)
CGSC 8410 - Perspectives in Learning, Perception, and Cognition (2.0 cr)
CSCI 5106 - Programming Languages (3.0 cr)
CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)
CSCI 5271 - Introduction to Computer Security (3.0 cr)
CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)
CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)
CSCI 5481 - Computational Techniques for Genomics (3.0 cr)
CSCI 5511 - Artificial Intelligence I (3.0 cr)

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CSCI 5521 - Machine Learning Fundamentals (3.0 cr)
CSCI 5525 - Machine Learning: Analysis and Methods (3.0 cr)
CSCI 5607 - Fundamentals of Computer Graphics 1 (3.0 cr)
CSCI 5608 - Fundamentals of Computer Graphics II (3.0 cr)
CSCI 5707 - Principles of Database Systems (3.0 cr)
CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)
CSCI 5801 - Software Engineering I (3.0 cr)
CSCI 8725 - Databases for Bioinformatics (3.0 cr)
DES 5185 - Human Factors in Design (3.0 cr)
EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
EPSY 5621 *{Inactive}*(3.0 cr)
GCD 8103 - Human Histology (5.0 cr)
HINF 5440 - Foundations of Translational Bioinformatics (3.0 cr)
HINF 5450 - Foundations of Precision Medicine Informatics (3.0 cr)
HINF 5494 - Topics in Health Informatics (1.0 - 3.0 cr)
HINF 5496 - Internship in Health Informatics (1.0 - 6.0 cr)
HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)
HINF 5610 - Foundations of Biomedical Natural Language Processing (3.0 cr)
HINF 5620 - Data Visualization for the Health Sciences (3.0 cr)
HINF 5630 - Clinical Data Mining (3.0 cr)
HINF 5640 - Advanced Translational Bioinformatics Methods (3.0 cr)
HINF 5650 - Integrative Genomics and Computational Methods (3.0 cr)
HINF 8220 - Computational Causal Analytics (3.0 cr)
HINF 8405 - Advanced Topics in Health Informatics I (1.0 - 4.0 cr)
HINF 8406 - Advanced Topics in Health Informatics II (1.0 - 4.0 cr)
HINF 8430 - Foundations of Health Informatics I Lab (2.0 cr)
HINF 8431 - Foundations of Health Informatics II Lab (2.0 cr)
HINF 8440 - Foundations of Translational Bioinformatics Lab (2.0 cr)
HINF 8492 - Advanced Readings or Research in Health Informatics (1.0 - 6.0 cr)
HINF 8525 - Health Informatics Teaching (2.0 cr)
HINF 8535 - Advanced Health Informatics Research Methods (3.0 cr)
IDSC 6041 - Information Technology Management (2.0 cr)
IDSC 6051 - Information Technologies and Solutions (2.0 cr)
IDSC 6471 - Knowledge Management (2.0 cr)
IDSC 8721 - Behavioral Decision Theory (3.0 cr)
IE 8521 - Optimization (4.0 cr)
IE 8531 - Discrete Optimization (4.0 cr)
KIN 5001 - Foundations of Human Factors/Ergonomics (3.0 cr)
LING 5001 - Introduction to Linguistics (4.0 cr)
LING 5205 - Semantics (3.0 cr)
LING 5801 - Introduction to Computational Linguistics (3.0 cr)
MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)
MATH 5467 - Introduction to the Mathematics of Image and Data Analysis (4.0 cr)
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)
MEDC 5245 - Introduction to Drug Design (3.0 cr)
MILI 6992 - Healthcare Delivery Innovations:Optimizing Cost and Quality (2.0 cr)
MILI 6995 - Medical Industry Valuation Laboratory (2.0 cr)
NURS 5115 - Nursing Informatics and Digital Health Technologies (3.0 cr)
NURS 5117 - Consumer Health Informatics Practicum (2.0 cr)
NURS 6105 - Systems Analysis and Design (3.0 cr)
NURS 7106 - Knowledge Representation and Interoperability Practicum (2.0 cr)
NURS 7109 - Population Health Informatics Practicum (2.0 cr)
NURS 7113 - Clinical Decision Support: Theory (2.0 cr)
NURS 7114 - Clinical Decision Support Practicum (2.0 cr)
NURS 7118 - Human Factors and Human-Computer Interaction in Health Informatics (3.0 cr)
NURS 7610 - Nurses Leading Change and Innovation to Transform Healthcare (3.0 cr)
PHAR 6224 - Advanced Pharmacogenomics and Precision Medicine (2.0 cr)
PUBH 6020 - Fundamentals of Social and Behavioral Science (2.0 cr)
PUBH 6025 *{Inactive}*(2.0 cr)
PUBH 6102 - Issues in Environmental Health (2.0 cr)
PUBH 6131 - Working in Global Health (2.0 cr)
PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)
PUBH 6325 - Data Processing with PC-SAS (1.0 cr)
PUBH 6341 - Epidemiologic Methods I (3.0 cr)
PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)

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PUBH 6420 - Introduction to SAS Programming (1.0 cr)
PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)
PUBH 6555 - Health Economics (2.0 cr)
PUBH 6556 - Health and Health Systems (3.0 cr)
PUBH 6557 - Health Finance I (3.0 cr)
PUBH 6558 - Health Finance II (3.0 cr)
PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)
PUBH 6562 - Information Technology in Health Care (2.0 cr)
PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)
PUBH 6565 - Innovation of Healthcare Services (2.0 cr)
PUBH 6617 *{Inactive}*(3.0 cr)
PUBH 6717 - Decision Analysis for Health Care (2.0 cr)
PUBH 6724 - The Health Care System and Public Health (3.0 cr)
PUBH 6742 - Ethics in Public Health: Research and Policy (1.0 cr)
PUBH 6751 - Principles of Management in Health Services Organizations (2.0 cr)
PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)
PUBH 6780 - Topics in Public Health Administration and Policy (1.0 - 3.0 cr)
PUBH 6800 - Topics: Health Services Research and Policy (0.5 - 4.0 cr)
PUBH 6802 *{Inactive}*(3.0 cr)
PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)
PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)
PUBH 6814 *{Inactive}*(2.0 cr)
PUBH 6832 - Economics of the Health Care System (3.0 cr)
PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)
PUBH 6863 - Understanding Health Care Quality (2.0 cr)
PUBH 6876 *{Inactive}*(2.0 cr)
PUBH 7400 - Topics: Biostatistics (0.5 - 4.0 cr)
PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)
PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)
PUBH 7405 - Biostatistical Inference I (4.0 cr)
PUBH 7407 - Analysis of Categorical Data (3.0 cr)
PUBH 7415 - Introduction to Clinical Trials (3.0 cr)
PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)
PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)
PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)
PUBH 7460 - Advanced Statistical Computing (3.0 cr)
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)
PUBH 7588 - Information Uses in Long-Term Care (2.0 cr)
PUBH 8432 - Probability Models for Biostatistics (3.0 cr)
PUBH 8442 - Bayesian Decision Theory and Data Analysis (3.0 cr)
PUBH 8445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)
PUBH 8446 - Advanced Statistical Genetics and Genomics (3.0 cr)
PUBH 8452 - Advanced Longitudinal Data Analysis (3.0 cr)
PUBH 8462 - Advanced Survival Analysis (3.0 cr)
PUBH 8472 - Spatial Biostatistics (3.0 cr)
PUBH 8801 - Health Services Policy Analysis: Theory (1.0 cr)
PUBH 8810 - Research Studies in Health Care (3.0 cr)
STAT 5101 - Theory of Statistics I (4.0 cr)
STAT 5302 - Applied Regression Analysis (4.0 cr)
STAT 5303 - Designing Experiments (4.0 cr)
STAT 5401 - Applied Multivariate Methods (3.0 cr)
STAT 5511 - Time Series Analysis (3.0 cr)
STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)

Plan Options

Plan A
Take at least 10 master's thesis credits.
HINF 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

Plan B
Take the following course:

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HINF 8770 - Plan B Project (4.0 cr)

Program Sub-plans

A sub-plan is not required for this program.
Students may not complete the program with more than one sub-plan.

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