

Personal Health Informatics, PhD

Northeastern University's Doctor of Philosophy in Personal Health Informatics is a transdisciplinary doctoral program focused on educating top researchers in the theoretical underpinnings, design, evaluation, and dissemination of consumer- and patient-focused health systems. Personal health technologies are those that non-health professionals interact with *directly*, both in and out of a clinical setting and in various life stages of illness and wellness.

Examples include:

- Assistive technologies that aid persons with disabilities
- Consumer wellness promotion technologies
- Patient education and counseling systems
- Interfaces for reviewing personal health records
- Advanced ambulatory monitoring for supporting health
- Automated elder care systems that monitor health and support independent living
- Social networking systems connecting families and their social and medical support networks

Developing personal health interface technologies requires that professionals have skills and experience designing systems for individual patients and consumers with a wide range of backgrounds in different contexts using a variety of media, while ensuring that fielded technologies are effective, reliable, and responsive to the needs of at-risk and patient populations. Critical skills and knowledge include needs assessment, theories of interface design and health behavior, rapid prototyping and implementation, experimental design with human subjects in challenging settings, and statistical data analysis and validation. Moreover, these skills must be deployed while working with, or leading, transdisciplinary teams.

The interdisciplinary nature of the program targets students who are interested in improving health and wellness using novel technologies that directly impact the lives of consumers and patients. This is a program for students who are not only technically strong but also socially conscious, design oriented, and interested in rigorously evaluating the technologies they imagine and build. The program provides a path for technical students to acquire more experience in the deployment and evaluation of health technologies in the field but also a path for students with health backgrounds to develop the technical skills needed to prototype and assess creative ideas they envision for improving care. The expected length of study is five years after the bachelor's degree.

Admission Requirements

Students will be accepted with either of the following:

- A bachelor's or higher degree in a technical discipline (e.g., computer science or information science, computer systems engineering) with either academic or work experience demonstrating a commitment to working in health.
- A bachelor's or higher degree in a health science discipline (e.g., nursing, medicine, physical therapy, pharmacy, public health) with either some academic coursework in technology, such as a course in programming or design, or work experience where the applicant participated in the development, adaptation, or evaluation of consumer- or patient-facing health technology. (Otherwise outstanding applicants without programming skills may be advised to take an introductory programming course prior to entry; otherwise outstanding applicants without any formal experience working in health settings may be advised to spend some time volunteering in a medical or community health setting prior to entry.)

Applicants will be expected to have:

- A minimum 3.000 undergraduate GPA
- A minimum total GRE score of 300 or equivalent
- A minimum GRE academic writing score of 3.5
- For international applicants, a minimum TOEFL score of 105

Minimum Academic Standards and Requirements

RESIDENCY REQUIREMENT

The residency requirement will follow the University Graduate Council By-Law policy.

TEACHING REQUIREMENT

All personal health informatics PhD students must satisfy the teaching requirement in order to graduate. This requirement is fulfilled when the student works as a teaching assistant or instructor of record for one semester and during this semester.

- Teaches at least three hours of classes
- Prepares at least one assignment, or quiz, or equivalent

PhD students are expected to satisfy the teaching requirement some time after completing their first year and at least one semester prior to scheduling their PhD defense.

DISSERTATION ADVISING

Each student will have one primary advisor from the personal health informatics doctoral program faculty.

DISSERTATION COMMITTEE

The committee will consist of at least three members: the dissertation advisor, one additional personal health informatics doctoral program faculty member, and one member external to Northeastern who is an expert in the specific personal health informatics topic of research. The dissertation committee shall include experts with both health and technology backgrounds. The dissertation advisor must be a full-time member of the Northeastern faculty.

QUALIFYING EXAMINATION

The qualifying examination consists of a three-part exam conducted by a committee of three personal health informatics doctoral program faculty members, each overseeing one part of the exam. The research core of the exam is fulfilled with submission of a high-quality paper to a strong peer-reviewed conference or journal. The health component of the exam is fulfilled when the student passes a written exam developed by a faculty member with a health sciences background, and the technical component of the exam is fulfilled when the student passes an exam developed by a faculty member with a technical background. The content of the written exams and the paper topic are developed in consultation with each faculty member.

DEGREE CANDIDACY

A student is considered a PhD degree candidate upon meeting these conditions:

- Completion of core courses with a minimum GPA of 3.000 overall on the core courses
- Completion of the qualifying examination

COMPREHENSIVE EXAM

A PhD student must submit a written dissertation proposal to the dissertation committee. The proposal should identify the research problem, the research plan, and its potential impact on the field. A presentation of the proposal will be made in an open forum, and the student must successfully defend it before the dissertation committee.

DISSERTATION DEFENSE

A PhD student must complete and defend a dissertation that involves original research in personal health informatics.

Curriculum Requirements**REQUIRED AND ELECTIVE COURSES**

The curriculum is designed to provide all PhD students with a strong foundation in principles critical to the design and evaluation of personal health interfaces. All students take six core courses (24 semester hours) and the user-interface practicum (1 semester hour). The student must maintain a minimum GPA of 3.500 among the six core courses and receive a grade of B or better in each of these courses. All students must also fulfill the programming fundamentals requirement (4 semester hours) and the statistics fundamentals requirement (4 semester hours), where some flexibility in course selection allows tailoring based on background and experience. Two additional research electives (8 semester hours) are selected based on research interests from the personal health informatics electives list. Students are also expected to participate in the personal health informatics seminar series during semesters when it is run.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Qualifying examination
Annual review
Dissertation proposal
Dissertation committee
Dissertation defense

Core Requirements

A grade of B or higher is required in each course. A cumulative 3.500 grade-point average is required for the core requirement.

Code	Title	Hours
Foundations		
HINF 5200	Theoretical Foundations in Personal Health Informatics	4
Program Design and Development		
CS 5010	Programming Design Paradigm (or another programming course)	4
CS 7340	Theory and Methods in Human Computer Interaction	4
HINF 5300	Personal Health Interface Design and Development	4
Methods and Statistics		
CS 7300	Empirical Research Methods for Human Computer Interaction	4
Complete one of the following:		3-4
CAEP 7712	Intermediate Statistical Data Analysis Techniques	

CS 7200	Statistical Methods for Computer Science	
PHTH 5210	Biostatistics in Public Health	
PHTH 6440	Advanced Methods in Biostatistics	
Evaluation		
HINF 5301	Evaluating Health Technologies	4
HINF 8982	Readings	1-8

Electives

Code	Title	Hours
Complete 12–17 semester hours in the following subject areas to fulfill the minimum program hours (see faculty advisor for other acceptable elective courses):		12-17
CAEP		
CS		
HINF		
PHTH		

Dissertation

Code	Title	Hours
HINF 9990	Dissertation Term 1	
HINF 9991	Dissertation Term 2	

Program Credit/GPA Requirements

48 total semester hours required
 Minimum 3.000 GPA required

Plan of Study

Sample Plan of Study

Code	Title	Hours
Year 1		
<i>Fall Semester</i>		
CS 7340	Theory and Methods in Human Computer Interaction	
HINF 5200	Theoretical Foundations in Personal Health Informatics	
<i>Spring Semester</i>		
CS 5010 or CS 5520	Programming Design Paradigm Mobile Application Development	
CS 7300	Empirical Research Methods for Human Computer Interaction	
Year 2		
<i>Fall Semester</i>		
HINF 5300	Personal Health Interface Design and Development	
PHTH 5210 or PHTH 6440 or CAEP 7712 or CS 7200	Biostatistics in Public Health Advanced Methods in Biostatistics Intermediate Statistical Data Analysis Techniques Statistical Methods for Computer Science	
<i>Spring Semester</i>		
HINF 5301	Evaluating Health Technologies	
Personal health informatics electives		
Year 3		
<i>Fall Semester</i>		
HINF 9990	Dissertation Term 1	
HINF 8982	Readings	
<i>Spring Semester</i>		
HINF 9991	Dissertation Term 2	
Personal health informatics electives		
Year 4		
<i>Fall Semester</i>		

HINF 9996	Dissertation Continuation
<i>Spring Semester</i>	
HINF 9996	Dissertation Continuation
Year 5	
<i>Fall Semester</i>	
HINF 9996	Dissertation Continuation
<i>Spring Semester</i>	
HINF 9996	Dissertation Continuation