# Informatics, MS

The MS in informatics is a non-research, course-based program for students who wish to enhance their careers with advanced knowledge of informatics. The coursework combines core informatics courses with cognate courses in one of these areas: geoinformatics, health informatics, or human-computer interaction.

## Learning Outcomes

Students will exhibit:

- understanding of computational thinking concepts;
- experience in software development;
- expertise in data analytics methods;
- comprehension of and practice applying human-centered computing concepts;
- awareness of professional ethics; and
- domain-specific knowledge and skills related to the cognate area.

## Requirements

The Master of Science program in informatics requires a total of 31 s.h. of graduate credit, including 19 s.h. of core courses and 12 s.h. of coursework in a chosen subprogram: geoinformatics, health informatics, or human-computer interaction. Students must maintain a Graduate College Program grade-point average of at least 3.00.

The MS in informatics requires the following coursework.

## Core Courses

All students complete the following core courses.

### Programming

| Course # | Title | Hours |
|---|---|---|
| This course: | | |
| CS:5110/IGPI:5110 | Introduction to Informatics | 3 |
| One of these: | | |
| CS:3010 | Software Engineering Fundamentals in Java | 3 |
| CS:3210 | Programming Languages and Tools | 3 |
| CS:3980 | Topics in Computer Science I | 3 |
| SEES:3050/ IGPI:3050 | Geospatial Programming (required for geoinformatics cognate) | 3 |

### Statistics

| Course # | Title | Hours |
|---|---|---|
| One of these: | | |
| BIOS:4120 | Introduction to Biostatistics (required for health informatics cognate) | 3 |
| STAT:4143/ PSQF:4143 | Introduction to Statistical Methods | 3 |

### Data Science

| Course # | Title | Hours |
|---|---|---|
| One of these: | | |
| BAIS:6480/ IGPI:6480 | Knowledge Discovery | 3 |
| STAT:4540/ BAIS:4540/ DATA:4540/ IGPI:4540 | Statistical Learning | 3 |
| An approved course (consult advisor) | | 3 |

### Databases

| Course # | Title | Hours |
|---|---|---|
| One of these: | | |
| CS:4400 | Database Systems | 3 |
| SEES:4580/ IGPI:4581 | Introduction to Geographic Databases (required for geoinformatics cognate) | 3 |

### Human Factors

| Course # | Title | Hours |
|---|---|---|
| One of these: | | |
| CS:4500 | Research Methods in Human-Computer Interaction | 3 |
| CS:4510 | Human-Computer Interaction for Computer Science (if student has not taken CS:2520) | 3 |
| SEES:3540/ IGPI:3540 | Geographic Visualization (required for geoinformatics cognate) | 3 |

### Ethics

| Course # | Title | Hours |
|---|---|---|
| This course: | | |
| CS:5980 | Topics in Computer Science III | 1 |

## Subprograms

Students choose one of three subprograms and complete the requirements.

### Geoinformatics Subprogram

| Course # | Title | Hours |
|---|---|---|
| All of these: | | |
| SEES:3500/ IGPI:3500 | Introduction to Environmental Remote Sensing | 3 |
| SEES:3520/ IGPI:3520 | GIS for Environmental Applications | 3 |
| SEES:3570 | Light Detection and Ranging (LiDAR): Principles and Applications | 3 |
| SEES:4150/ GHS:4150/ IGPI:4150 | Health and Environment: GIS Applications | 3 |

## Health Informatics Subprogram

| Course # | Title | Hours |
|---|---|---|
| Four of these: | | |
| BIOL:3212/ IGPI:3212 | Bioinformatics for Beginners | 3 |
| BIOL:4386 | Introduction to Scientific Computing for Biologists | 3 |
| BIOS:5120/ IGPI:5120/ STAT:5610 | Regression Modeling and ANOVA in the Health Sciences | 3 |
| BMB:3310/ CBIO:3310/ MMED:3310 | Practical Data Science and Bioinformatics (recommended for students with a biology background) | 3 |
| BMB:4310/ BME:4310 | Computational Biochemistry | 3 |
| BME:5335 | Computational Bioinformatics | 3 |
| CS:4470 | Health Data Analytics | 3 |
| EPID:4400 | Epidemiology I: Principles | 3 |

## Human-Computer Interaction Subprogram

| Course # | Title | Hours |
|---|---|---|
| Three of these: | | |
| PSQF:6243/ STAT:6513 | Intermediate Statistical Methods | 3 |
| PSY:3060 | Sensation and Perception | 3 |
| An approved elective (consult director) | | 3 |
| One of these: | | |
| CS:4500 | Research Methods in Human-Computer Interaction (if not taken to satisfy Human Factors requirement) | 3 |
| CS:4510 | Human-Computer Interaction for Computer Science (if not taken to satisfy Human Factors requirement and if have not taken CS:2520) | 3 |
| ISE:6211 | Human Factors in Healthcare Systems | 3 |
| ISE:6220 | Cognitive Engineering | 3 |

For more information about the Master of Science requirements, see the Interdisciplinary Graduate Program in Informatics website.

# Combined Programs

# MS (Health Informatics–Pharmacy Subprogram)/PharmD

The purpose of the combined program is to provide an opportunity for professional students in the College of Pharmacy to receive formal training in health informatics in addition to training in pharmacotherapy and health care. Students completing the degree program receive an MS in informatics with the health informatics–pharmacy subprogram (without thesis) from the Graduate College and a PharmD from the College of Pharmacy. Students develop special expertise in information technology, including management of electronic health records, health information exchange standards, electronic prescribing, medication management, decision support, and other competencies.

The combined program requires 34 s.h. Courses that can be used to count toward both programs include 19 s.h. of core courses, 6 s.h. of courses from the health informatics cognate, and 9 s.h. from the PharmD curriculum selected from the following.

| Course # | Title | Hours |
|---|---|---|
| PHAR:8209 | Introductory Pharmacy Practice Experiences Hospital | 3 |
| PHAR:8250 | Applications of Pharmacy Practice I | 2 |
| PHAR:8265 | Applications of Pharmacy Practice II | 2 |
| PHAR:8374 | Applications of Pharmacy Practice III | 2 |
| PHAR:8378 | Pharmacy Law and Ethics | 2 |

A separate application for each degree program is required. Applicants must be admitted to both programs before they may be admitted to the combined degree program. It is recommended that students apply to the Graduate College for admission to the MS program before entering the spring semester of their first year in the pharmacy program. For more information, see Doctor of Pharmacy, PharmD in the College of Pharmacy section of the catalog.

# Admission

Applicants must meet the admission requirements of the Graduate College; see the Manual of Rules and Regulations on the Graduate College website. They must also meet the admission requirements of the informatics subprogram they want to enter; see PhD and MS Admission on the program's website.

# Academic Plans

# Sample Plans of Study

Sample plans represent one way to complete a program of study. Actual course selection and sequence will vary and should be discussed with an academic advisor. For additional sample plans, see MyUI.

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### Geoinformatics Subprogram

| Course | Title | Hours |
|---|---|---|
| **Academic Career** | | |
| **Any Semester** | | |
| 31 s.h. must be graduate level coursework; graduate transfer credits allowed upon approval. More information is included in the General Catalog and on department website. [a] | | |
| | **Hours** | **0** |

| | | |
|---|---|---|
| **First Year** | | |
| **Fall** | | |
| STAT:4143 or BIOS:4120 | Introduction to Statistical Methods or Introduction to Biostatistics | 3 |
| CS:5110 | Introduction to Informatics | 3 |
| Programming course [b] | | 3 |
| | **Hours** | **9** |
| **Spring** | | |
| BAIS:6480 or STAT:4540 | Knowledge Discovery or Statistical Learning | 3 |
| CS:4400 or SEES:4580 | Database Systems or Introduction to Geographic Databases | 3 |
| CS:5980 | Topics in Computer Science III [c] | 1 |
| SEES:3500 | Introduction to Environmental Remote Sensing | 3 |
| | **Hours** | **10** |
| **Second Year** | | |
| **Fall** | | |
| CS:4510 or CS:4500 or SEES:3540 | Human-Computer Interaction for Computer Science or Research Methods in Human-Computer Interaction or Geographic Visualization | 3 |
| SEES:3520 | GIS for Environmental Applications | 3 |
| | **Hours** | **6** |
| **Spring** | | |
| SEES:3570 | Light Detection and Ranging (LiDAR): Principles and Applications | 3 |
| SEES:4150 | Health and Environment: GIS Applications | 3 |
| | **Hours** | **6** |
| | **Total Hours** | **31** |

a Students must complete specific requirements in the University of Iowa Graduate College after program admission. Refer to the Graduate College website and the Manual of Rules and Regulations for more information.
b Choose from CS:3010, CS:3210, CS:3980, SEES:3050.
c Typically this course is offered in spring semesters only. Check MyUI for course availability since offerings are subject to change.

## Health Informatics Subprogram

| Course | Title | Hours |
|---|---|---|
| **Academic Career** | | |
| **Any Semester** | | |
| 31 s.h. must be graduate level coursework; graduate transfer credits allowed upon approval. More information is included in the General Catalog and on department website. [a] | | |
| | **Hours** | **0** |
| **First Year** | | |
| **Fall** | | |
| STAT:4540 or BIOS:4120 | Statistical Learning or Introduction to Biostatistics | 3 |
| CS:4400 or SEES:4580 | Database Systems or Introduction to Geographic Databases | 3 |
| CS:5110 | Introduction to Informatics | 3 |
| | **Hours** | **9** |
| **Spring** | | |
| BAIS:6480 or STAT:4540 | Knowledge Discovery or Statistical Learning | 3 |
| CS:5980 | Topics in Computer Science III [b] | 1 |
| Health informatics course [c] | | 3 |
| Programming course [d] | | 3 |
| | **Hours** | **10** |
| **Second Year** | | |
| **Fall** | | |
| CS:4500 or SEES:3540 or CS:4510 | Research Methods in Human-Computer Interaction or Geographic Visualization or Human-Computer Interaction for Computer Science | 3 |
| Health informatics course [c] | | 3 |
| | **Hours** | **6** |
| **Spring** | | |
| Health informatics course [c] | | 3 |
| Health informatics course [c] | | 3 |
| | **Hours** | **6** |
| | **Total Hours** | **31** |

a Students must complete specific requirements in the University of Iowa Graduate College after program admission. Refer to the Graduate College website and the Manual of Rules and Regulations for more information.
b Typically this course is offered in spring semesters only. Check MyUI for course availability since offerings are subject to change.
c See the General Catalog for list of approved courses.
d Choose from CS:3010, CS:3210, CS:3980, SEES:3050.

## Human-Computer Interaction Subprogram

| Course | Title | Hours |
|---|---|---|
| **Academic Career** | | |
| **Any Semester** | | |
| 31 s.h. must be graduate level coursework; graduate transfer credits allowed upon approval. More information is included in the General Catalog and on department website. [a] | | |
| | **Hours** | **0** |
| **First Year** | | |
| **Fall** | | |
| BIOS:4120 or STAT:4143 | Introduction to Biostatistics or Introduction to Statistical Methods | 3 |
| SEES:4580 or CS:4400 | Introduction to Geographic Databases or Database Systems | 3 |
| CS:5110 | Introduction to Informatics | 3 |
| | **Hours** | **9** |
| **Spring** | | |
| BAIS:6480 or STAT:4540 | Knowledge Discovery or Statistical Learning | 3 |

| | | |
|---|---|---|
| CS:4510<br>or SEES:3540<br>or CS:4500 | Human-Computer Interaction for Computer Science<br>or Geographic Visualization<br>or Research Methods in Human-Computer Interaction | 3 |
| CS:5980 | Topics in Computer Science III [b] | 1 |
| Programming course [c] | | 3 |
| | **Hours** | **10** |
| **Second Year** | | |
| **Fall** | | |
| Human-computer interaction course [d] | | 3 |
| Human-computer interaction course [d] | | 3 |
| | **Hours** | **6** |
| **Spring** | | |
| Human-computer interaction course [d] | | 3 |
| Human-computer interaction course [d] | | 3 |
| | **Hours** | **6** |
| | **Total Hours** | **31** |

a Students must complete specific requirements in the University of Iowa Graduate College after program admission. Refer to the Graduate College website and the Manual of Rules and Regulations for more information.

b Typically this course is offered in spring semesters only. Check MyUI for course availability since offerings are subject to change.

c Choose from CS:3010, CS:3210, CS:3980, SEES:3050.

d See the General Catalog for list of approved courses.