Informatics, BS

The major in informatics provides students with the necessary training for employment in careers such as software development, user experience, and data analytics. It provides good preparation for graduate study in a variety of disciplines.

Students may declare a major in informatics when they are admitted to the university or afterward. All students begin the majors as Bachelor of Arts students but may switch to the Bachelor of Science program at any time.

The informatics major combines fundamental and practical computing knowledge with a choice of cognate areas from the liberal arts and sciences, providing students with the necessary background and specialized skills to work at the interface of computing and another discipline. Students may begin the major without a chosen cognate area; they may declare a cognate at any time. Some cognates are available only with the Bachelor of Arts, others are available only with the Bachelor of Science. A student's choice of cognate determines whether the student will earn a BA or a BS.

Informatics majors are advised at the Academic Advising Center until they have completed 30 s.h., at which point they are assigned a departmental advisor. Students being advised at the Academic Advising Center also can consult with an informatics faculty advisor.

Transfer students who have taken a course approved as equivalent to a required informatics or computer science course are exempt from that course. Transfer course grades are included in the informatics grade-point average.

Students should consult the Department of Computer Science website or visit the department's office for information about general policies, elective areas, and internships, scholarships, and student groups, such as the university's chapter of the Association for Computing Machinery (ACM) and Women in Computing Sciences (WiCS).

Many informatics major courses are offered once per year and have prerequisites that are also only offered annually. Speak with an advisor for more information.

Advanced Placement

The Computer Science Advanced Placement (AP) exam may be used to satisfy requirements. See Advanced Placement Credit Policy on the Department of Computer Science website.

Learning Outcomes

- Students can apply computational thinking approaches to solve problems.
- Students can individually and collaboratively develop software using professional tools.
- Students can extract, organize, analyze, and present data from a variety of sources.
- Students can contribute to the development of usable, useful, and enjoyable software applications by using human-centered methods.
- Students understand social, professional, and ethical issues related to computing.
- Students have a thorough understanding of a chosen cognate area.

Requirements

The Bachelor of Science with a major in informatics requires a minimum of 120 s.h., including at least 55–60 s.h. of work for the major. Students must maintain a grade-point average of at least 2.00 in all courses for the major and in all UI courses for the major. A cumulative GPA of at least 2.00 is required for graduation. Students also must complete the College of Liberal Arts and Sciences GE CLAS Core.

The program combines foundational informatics coursework with coursework in a cognate area. The major offers the cognate areas of bioinformatics, medical informatics, and individualized cognates. Required credit for the major depends on a student's choice of cognate area.

Students who major in informatics may not also major in computer science, business analytics and information systems, or computer science and engineering. They may, however, earn a minor in computer science.

Coursework for the major includes the informatics core, two electives, a statistics course, and a set of courses in the chosen cognate area. Work for the major may not be taken pass/nonpass. Students are expected to have taken MATH:1005 College Algebra or the equivalent.

Departmental Residency Requirement

Students must complete at least five courses (minimum of 15 s.h.) at the University of Iowa from the following: CS:3910 Informatics Project and four additional courses numbered CS:2500–CS:4999; these courses are requirements for the BS in informatics as listed below.

Program Requirements

The BS with a major in informatics requires the following coursework. Many courses for the major require a minimum grade of C-minus in prerequisite courses.

Requirements	Hours
Informatics Core Courses	19
Informatics Electives	6
Statistics Course	3-4
Cognate Courses	27-31

Informatics Core

The informatics core consists of six required computing courses (19 s.h.) that emphasize data manipulation, databases, and networking. It provides more applications-oriented content than the traditional computer science curriculum yet is designed to offer students a sound basis in underlying computer science themes and techniques.

Course #	Title	Hours
All of these:		
CS:1110	Introduction to Computer Science	3
CS:2110	Programming for Informatics	4
CS:2420	Analyzing Data for Informatics	3
CS:2520	Human-Computer Interaction for Informatics	3

CS:2620	Server-Side Development for Informatics	3
CS:3910	Informatics Project	3

Informatics Electives

Students must complete at least two courses (6 s.h.) from a list of approved computing informatics electives. Course selection must be approved by an informatics advisor. In addition to the courses listed below, students may have additional choices from the Department of Electrical and Computer Engineering and the Department of Business Analytics; consult an informatics faculty advisor for additional choices.

Course #	Title	Hours
BAIS:4220	Advanced Database Management and Big Data	3
A computer science course (prefix CS) numbered 3000-4999, including CS:3990 for 3 s.h., but excluding CS:3910 and CS:4510		

Statistics Course

Students must complete one introductory statistics course. Some cognates require a specific statistic course. Students should consult with their advisors to choose a statistics course appropriate for their cognate area.

Course #	Title	Hours
One of these:		
SOC:2160	Applied Statistics for Social Scientists	3
STAT:1020	Elementary Statistics and Inference	3
STAT:1030	Statistics for Business	4
STAT:2010	Statistical Methods and Computing	3
STAT:2020	Probability and Statistics for the Engineering and Physical Sciences	3
STAT:3120	Probability and Statistics	4
STAT:3510	Biostatistics	3
STAT:4143	Introduction to Statistical Methods	3

Cognates

Students must complete all requirements listed under one of the cognate areas below: bioinformatics, medical informatics, or an individualized cognate.

Bioinformatics

The informatics major with the bioinformatics cognate requires a minimum of 58 s.h. of work for the major, including at least 30 s.h. in cognate courses. The bioinformatics cognate is intended for students interested in applications of computing to the biological sciences. It may lead to careers in laboratory research, biotechnology, data management, and other related areas. It also may prepare students for graduate programs in bioinformatics or genetics. Cognate courses are drawn primarily from biology and chemistry.

Students who choose the bioinformatics cognate must satisfy the major's statistics requirement with either STAT:2010 Statistical Methods and Computing or STAT:3510 Biostatistics.

Course #	Title	Hours
All of these:		
BIOL:1411	Foundations of Biology	4
BIOL:1412	Diversity of Form and Function	4
CHEM:1110	Principles of Chemistry I	4
CHEM:1120	Principles of Chemistry II	4
BIOL:2512	Fundamental Genetics	4
BIOL:3172	Evolution	4
Two of these:		
BIOL:2673	Ecology	3
BIOL:3212	Bioinformatics for Beginners	3
BIOL:3314	Genomics	3

Medical Informatics

The informatics major with the medical informatics cognate requires a minimum of 56 s.h. of work for the major, including at least 28 s.h. in cognate courses. The medical informatics cognate is intended for students interested in applications of computing to health care, especially in a clinical setting. It may lead to careers in medical or hospital settings, graduate programs in medical informatics, or professional degree programs in medicine, dentistry, nursing, or other allied health professions. Cognate courses are drawn from biology, chemistry, health and human physiology, and public health.

Students who choose the medical informatics cognate must satisfy the major's statistics requirement with either STAT:2010 Statistical Methods and Computing or STAT:3510 Biostatistics.

Course #	Title	Hours
All of these:		
BIOL:1411-BIOL:1412	Foundations of Biology - Diversity of Form and Function	8
CHEM:1110 & CHEM:1120	Principles of Chemistry I-II	8
CHEM:2210 & CHEM:2220	Organic Chemistry I-II	6
At least two of these:		
BIOL:2512	Fundamental Genetics	4
BIOL:3172	Evolution	4
CHEM:2410	Organic Chemistry Laboratory	3
HHP:1100	Human Anatomy	3
HMP:4000	Introduction to the U.S. Health Care System	3

Individualized Cognates

Individualized cognates may be drawn primarily from one department or an appropriate mix of departments; they require an approved set of cognate courses totaling 27–31 s.h. Students interested in developing individualized cognates should contact the Department of Computer Science for the name of an informatics faculty advisor.

Early Admission to the Graduate College

Undergraduate informatics students who have 6 s.h. or less to earn toward graduation may apply for early admission to the Graduate College. Early admission allows students in their final undergraduate semester to take courses for graduate

credit in addition to the courses they need to complete their bachelor's degrees.

Combined Programs

BS/MS in Informatics (Geoinformatics or Health Informatics or Human-Computer Interaction Subprogram)

Students majoring in informatics who are interested in earning a master's degree in informatics may apply to the combined BS/MS program (geoinformatics or health informatics or human-computer interaction subprogram) offered by the College of Liberal Arts and Sciences and the Graduate College. The program enables students to begin the study of informatics before they complete their bachelor's degree. Students are able to complete both degrees in less time than if they were to complete the two degrees separately.

Separate application to each degree program is required. Applicants must be admitted to both programs before they may be admitted to the combined degree program. For more information about the graduate degree program, see the MS in informatics (Graduate College) in the catalog.

Honors

Honors in the Major

Students majoring in informatics have the opportunity to graduate with honors in the major. They must maintain a minimum UI cumulative grade-point average (GPA) of 3.33 and a minimum major GPA of 3.50; additionally, students complete 4–6 s.h. of CS:3990 Honors in Computer Science or Informatics and submit an acceptable honors thesis or project. At any time, students can communicate to the computer science professional advisor that they have an honors interest and can have that designation placed on their academic record.

A student is responsible for finding a faculty member willing to supervise the honors project. The student can register for CS:3990 Honors in Computer Science or Informatics under the project supervisor's name once the faculty member approves the proposed project and a timetable for the work. Once that is accomplished, the student must then communicate with the Department of Computer Science honors director, who changes the student's status to denote the student is pursuing honors in the major. It is not necessary to have declared an honors interest before finding a thesis supervisor and beginning to pursue honors in the major, but the student must be coded as pursuing honors prior to completing the application for degree.

An honors project can be completed in one semester, but it usually takes two semesters to complete. In the final semester, a student must register for CS:3999 Computer Science or Informatics Honors Cohort. The honors thesis/project must be approved by the thesis supervisor and then submitted to the honors director who will give initial approval that the student can graduate with honors in the major. Final approval is given after final grades are submitted and all requirements are met. For more details regarding project requirements, see Honors in Computer Science on the department's website.

University of Iowa Honors Program

In addition to honors in the major, students can pursue honors study and activities through membership in the University of Iowa Honors Program. Visit Honors at Iowa to learn about the university's honors program.

Membership in the UI Honors Program is not required to earn honors in the informatics major. However, the semester hours earned in CS:3990 Honors in Computer Science or Informatics can be used to partially satisfy the UI Honors requirement of 12 s.h. of experiential learning coursework.

For more information, contact the Department of Computer Science honors director.

Career Advancement

Informatics graduates work in a broad range of market sectors, reflecting the interdisciplinary nature of the program and the large number of available cognates. Students will have technical skills along with a specialty area that can help them pursue a specific type of organization or interest field. Here are just a few of the areas that informatics graduates have pursued: software development, database and/or web administration, data analysis, software support (IT), user interface/user experience design (the human-computer interaction cognate is useful for this area), and health care information (the health informatics cognate is useful for this area).

A recent job placement survey indicates that more than 90% of University of Iowa informatics graduates have a job, are continuing education, or are not seeking employment within six months of graduation.

View post-graduation data on the Pomerantz Career Center website, which uses University of Iowa placement information to explore what recent informatics alumni are doing, including median salaries, job titles, companies of employment, and other facts about UI graduates.

The Pomerantz Career Center offers multiple resources to help students find internships and jobs.

Academic Plans

Four-Year Graduation Plan

The Four-Year Graduation Plan is not available to BS students majoring in informatics. Students work with their advisors on individual graduation 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.

Informatics, BS

- Bioinformatics Track [p. 4]
- Medical Informatics Track [p. 4]

Bioinformatics Track

Course	Title	Hours
Academic Career		
Any Semester		
GE CLAS Core: Sustainability [a]		
	Hours	**0**
First Year		
Fall		
CS:1110	Introduction to Computer Science	3
CHEM:1110	Principles of Chemistry I [b]	4
ENGL:1200 or RHET:1030	The Interpretation of Literature or Rhetoric	3 - 4
GE CLAS Core: Diversity and Inclusion [c]		3
CSI:1600	Success at Iowa	2
	Hours	**15-16**
Spring		
CS:2110	Programming for Informatics	4
CHEM:1120	Principles of Chemistry II	4
ENGL:1200 or RHET:1030	The Interpretation of Literature or Rhetoric	3
Elective course [d]		3
	Hours	**14**
Second Year		
Fall		
BIOL:1411	Foundations of Biology	4
Major: statistics requirement [e]		3
GE CLAS Core: Social Sciences [c]		3
GE CLAS Core: World Languages First Level Proficiency or elective course [f]		4 - 5
Elective course [d]		1
	Hours	**15-16**
Spring		
CS:2420	Analyzing Data for Informatics	3
CS:2520	Human-Computer Interaction for Informatics	3
BIOL:1412	Diversity of Form and Function	4
GE CLAS Core: International and Global Issues [c]		3
GE CLAS Core: World Languages Second Level Proficiency or elective course [f]		4 - 5
	Hours	**17-18**
Third Year		
Fall		
CS:2620	Server-Side Development for Informatics	3
GE CLAS Core: Historical Perspectives [c]		3
GE CLAS Core: World Languages Third Level Proficiency or elective courses [f]		4 - 5
Elective course [d]		3
Elective course [d]		2
	Hours	**15-16**
Spring		
BIOL:2512	Fundamental Genetics	4
Major: advanced informatics elective [g]		3
GE CLAS Core: Literary, Visual, and Performing Arts [c]		3
GE CLAS Core: World Languages Fourth Level Proficiency or elective course [f]		4 - 5
Elective course [d]		2
	Hours	**16-17**
Fourth Year		
Fall		
BIOL:3172	Evolution	4
Major: advanced informatics elective [g]		3
GE CLAS Core: Values and Culture [c]		3
Elective course [d]		3
Elective course [d]		2
	Hours	**15**
Spring		
CS:3910	Informatics Project	3
Major: advanced biology elective [h]		3
Major: advanced biology elective [h]		3
Elective course [d]		3
Elective course [d]		3
Degree Application: apply on MyUI before deadline (typically in February for spring, September for fall) [i]		
	Hours	**15**
	Total Hours	**122-127**

a Sustainability must be completed by choosing a course that has been approved for Sustainability AND for one of these General Education areas: Natural Sciences; Quantitative and Formal Reasoning; Social Sciences; Historical Perspectives; International and Global Issues; Literary, Visual, and Performing Arts; or Values and Culture.

b Enrollment in chemistry courses requires completion of a placement exam.

c GE CLAS Core courses may be completed in any order unless used as a prerequisite for another course. Students should consult with an advisor about the best sequencing of courses.

d Students may use elective courses to earn credit towards the total s.h. required for graduation or to complete a double major, minors, or certificates.

e Choose from STAT:2010 or STAT:3510.

f Students who have completed four years of a single language in high school have satisfied the GE CLAS Core World Languages requirement. Enrollment in world languages courses requires a placement exam, unless enrolling in a first-semester-level course.

g BAIS:4220, or a computer science course (prefix CS) numbered 3000-4999, including CS:3990 for 3 s.h., but excluding CS:3910 and CS:4510.

h Students must choose from BIOL:2673, BIOL:3212, or BIOL:3314.

i Please see Academic Calendar, Office of the Registrar website for current degree application deadlines. Students should apply for a degree for the session in which all requirements will be met. For any questions on appropriate timing, contact your academic advisor or Graduation Services.

Medical Informatics Track

Course	Title	Hours
Academic Career		
Any Semester		
GE CLAS Core: Sustainability [a]		
	Hours	**0**

First Year

Fall

CS:1110	Introduction to Computer Science	3
CHEM:1110	Principles of Chemistry I [b]	4
RHET:1030 or ENGL:1200	Rhetoric or The Interpretation of Literature	3 - 4
GE CLAS Core: Diversity and Inclusion [c]		3
CSI:1600	Success at Iowa	2
	Hours	**15-16**

Spring

CS:2110	Programming for Informatics	4
CHEM:1120	Principles of Chemistry II	4
ENGL:1200 or RHET:1030	The Interpretation of Literature or Rhetoric	3 - 4
Elective course [d]		3
	Hours	**14-15**

Second Year

Fall

BIOL:1411	Foundations of Biology	4
Major: statistics requirement [e]		3
GE CLAS Core: Social Sciences [c]		3
GE CLAS Core: World Languages First Level Proficiency or elective course [f]		4 - 5
Elective course [d]		2
	Hours	**16-17**

Spring

CS:2420	Analyzing Data for Informatics	3
CS:2520	Human-Computer Interaction for Informatics	3
BIOL:1412	Diversity of Form and Function	4
GE CLAS Core: World Languages Second Level Proficiency or elective course [f]		4 - 5
Elective course [d]		2
	Hours	**16-17**

Third Year

Fall

CS:2620	Server-Side Development for Informatics	3
GE CLAS Core: Historical Perspectives [c]		3
GE CLAS Core: International and Global Issues [c]		3
GE CLAS Core: World Languages Third Level Proficiency or elective course [f]		4 - 5
Elective course [d]		3
	Hours	**16-17**

Spring

CHEM:2210	Organic Chemistry I	3
Major: advanced informatics elective [g]		3
GE CLAS Core: Literary, Visual, and Performing Arts [c]		3
GE CLAS Core: World Languages Fourth Level Proficiency or elective course [f]		4 - 5
Elective course [d]		3
	Hours	**16-17**

Fourth Year

Fall

CHEM:2220	Organic Chemistry II	3
Major: advanced informatics elective [g]		3
GE CLAS Core: Values and Culture [c]		3
Elective course [d]		3
Elective course [d]		3
	Hours	**15**

Spring

CS:3910	Informatics Project	3
Major: advanced science elective [h]		3
Major: advanced science elective [h]		3
Elective course [d]		3
Elective course [d]		3
Degree Application: apply on MyUI before deadline (typically in February for spring, September for fall) [i]		
	Hours	**15**
	Total Hours	**123-129**

a Sustainability must be completed by choosing a course that has been approved for Sustainability AND for one of these General Education areas: Natural Sciences; Quantitative and Formal Reasoning; Social Sciences; Historical Perspectives; International and Global Issues; Literary, Visual, and Performing Arts; or Values and Culture.

b Enrollment in chemistry courses requires completion of a placement exam.

c GE CLAS Core courses may be completed in any order unless used as a prerequisite for another course. Students should consult with an advisor about the best sequencing of courses.

d Students may use elective courses to earn credit towards the total s.h. required for graduation or to complete a double major, minors, or certificates.

e Choose from STAT:2010 or STAT:3510.

f Students who have completed four years of a single language in high school have satisfied the GE CLAS Core World Languages requirement. Enrollment in world languages courses requires a placement exam, unless enrolling in a first-semester-level course.

g BAIS:4220, or a computer science course (prefix CS) numbered 3000-4999, including CS:3990 for 3 s.h., but excluding CS:3910 and CS:4510.

h Choose from BIOL:2512, BIOL:3172, CHEM:2410, HHP:1100 or HMP:4000.

i Please see Academic Calendar, Office of the Registrar website for current degree application deadlines. Students should apply for a degree for the session in which all requirements will be met. For any questions on appropriate timing, contact your academic advisor or Graduation Services.