

# UNDERGRADUATE PROGRAM IN INFORMATICS

## COMPUTER SCIENCE DEPARTMENT

Effective Fall 2007

A major in Informatics, leading to BA and BS degrees, and a minor in Informatics are offered by the Computer Science Department in collaboration with other units drawn largely from the College of Liberal Arts and Sciences.

Informatics is an emerging discipline at the intersection of computing with the humanities, arts, and the natural, biological, health and social sciences. "Informatics" is generally taken to mean the application of algorithmic techniques and computing power to the acquisition and manipulation of data leading to the extraction of new knowledge. It is an interdisciplinary endeavor, integrating concepts and tools from computer science, information science, and systems engineering with those from cognate disciplines.

The Informatics major's combination of fundamental and practical computing knowledge with other liberal arts and sciences areas will be attractive to many regional and national employers. The major does not supplant the traditional disciplines; instead it provides students interested in working at the interface of computing and another discipline the necessary background and specialized skills for success.

The major will also provide good preparation for graduate study. Some cognates are excellent lead-ins for some of UI's own specialized graduate programs, such as the Interdisciplinary Graduate Program in Informatics (IGPI), with its subtracks in Information Science, Health Informatics, and Bioinformatics, and the Master of Public Health program.

## DEGREE REQUIREMENTS

To fulfill Informatics major requirements, students combine informatics coursework that provides a strong foundation in computing with coursework in one of several cognate disciplines. This enables a wide variety of multidimensional programs well-suited to the educational and economic needs of the 21st century. Specifically, students must complete:

- the *informatics core* consisting of 19 semester hours of instruction
- three (BA) or six (BS) semester hours of informatics electives
- a suitable statistics course (3-4 s.h.)
- an approved set of courses within a cognate area (BA 18-25 s.h., BS 27-31 s.h.)

Note that all informatics students are expected to possess appropriate high-school-level mathematical background. This requirement is formalized in the co-requisite for the second course in the informatics major, 22C:080.

The initially recognized cognate areas are:

- Fine and Applied Arts: Art, Music (BA)
- Human-Computer Interaction (BA)
- Information Science (BA)
- Linguistics (BA)
- Social Sciences: Sociology, Economics, Geography (BA)
- Biological Sciences (BS)
- Health Sciences (BA)
- Individualized cognates (BA or BS)

## INFORMATICS CORE

The design of the informatics core acknowledges that students working in informatics have different needs than students majoring in computer science, management information sciences (MIS), engineering, or other traditional computationally oriented disciplines. The informatics core provides more applications-oriented content than the traditional computer science curriculum, and emphasizes data manipulation, databases, and networking, yet it is designed to provide students sound bases in underlying computer science themes and techniques rather than a shallow “point here, click there” view of computing.

The informatics core courses consist of six required computing courses (19 s.h.):

22C:005 Introduction to Computer Science	3 s.h.
22C:080 Programming for Informatics	4 s.h.
22C:082 Human Computer Interaction	3 s.h.
22C:084 Databases for Informatics	3 s.h.
22C:086 Networking and Security for Informatics	3 s.h.
22C:094 Informatics Project	3 s.h.
<b>TOTAL</b>	<b>19 s.h.</b>

## INFORMATICS ELECTIVES

Students must also complete at least one course (3 s.h.) for the BA degree, or two courses (6 s.h.) for the BS degree, from a list of approved computing-oriented informatics electives. Many will be from the Computer Science Department, but other departments are expected to offer several synergistic courses as informatics electives, as well.

The initially approved courses are listed below, but additional courses will likely be added from, e.g., Management Sciences, Library and Information Science, and Electrical and Computer Engineering.

22C:096 Topics in Computer Science (some sections only)	<i>or</i>
22C:109 Programming Languages and Tools (some sections)	<i>or</i>
22C:1xx any computer science course numbered above 110	
<b>TOTAL</b>	<b>3 s.h. (BA) or 6 s.h. (BS)</b>

## STATISTICS REQUIREMENT

In addition to computationally oriented coursework, students must also complete an introductory statistics course. Note that individual cognate subtracts may impose additional constraints on the selection of this course.

22S:008 Statistics for Business	4 s.h. <i>or</i>
22S:025 Elementary Statistics and Inference	3 s.h. <i>or</i>
22S:030 Statistical Methods and Computing	3 s.h. <i>or</i>
22S:039 Probability and Statistics for Engineering and the Physical Sciences	3 s.h. <i>or</i>
22S:101 Introduction to Biostatistics	3 s.h. <i>or</i>
22S:102 Introduction to Statistical Methods	3 s.h. <i>or</i>
22S:120 Probability and Statistics	4 s.h.
<b>TOTAL</b>	<b>3-4 s.h.</b>

## COGNATES REQUIREMENTS

Requirements for cognate areas are specified in separate documents.

## INFORMATICS CORE COURSE DESCRIPTIONS

22C:005 Introduction to Computer Science provides a broad overview of computing for non-majors, minors, and informatics and computer science majors. Topics include computing fundamentals such as digital data representation, how computers work, algorithms and their efficiency, networks and databases, and hands-on experience with Web page development using state-of-the art software such as Flash. The course includes an overview of artificial intelligence and the scope and limitations of information technology. Lab projects, e.g. Web page development projects incorporating text, graphics, sound, animation and special effects, are a central and exciting part of the course.

22C:080 Programming for Informatics provides students with practical programming skills in an appropriate scripting language (e.g., Perl, Visual Basic, Python, Ruby or similar) along with an introduction to algorithm design (i.e., algorithmic idioms such as greedy algorithms, divide and conquer, backtracking search) and basic data structures (e.g., arrays, trees, strings, hashes, graphs). The course also provides a first exposure to relational databases. Prerequisite: 22C:005. Pre- or co-requisite: 22M:005, 22M:009, 22M:010, 22M:013, or 22M:015 (or MPT II score of 17 or higher).

22C:082 Human Computer Interaction provides students with an overview of principles and guidelines for the design of efficient, accurate and satisfactory user interactions. Practical applications include user-centered design, prototyping user interfaces, and the evaluation of user interfaces. Pre- or co-requisites: 22C:080 and a course fulfilling the informatics statistics requirement.

22C:084 Databases for Informatics students will learn to design, normalize, implement, and efficiently query relational databases using SQL, the nearly ubiquitous database query language. Prerequisite: 22C:080.

22C:086 Networking and Security for Informatics provides students with an introduction to computer networking, an overview of network organization and management, a basic understanding of encryption and network security, and some experience in network programming. Prerequisite: 22C:080.

22C:094 Informatics Project is a capstone course. In this course students, often working in small groups, design and implement a system from scratch. A prototypical project might be a database system with a web-based interface, or an application based on the Google maps API, etc. Prerequisites: 22C:082, 22C:084, and 22C:086.

### *Scheduled initial offerings and special “substitution” courses for academic year 2007-08.*

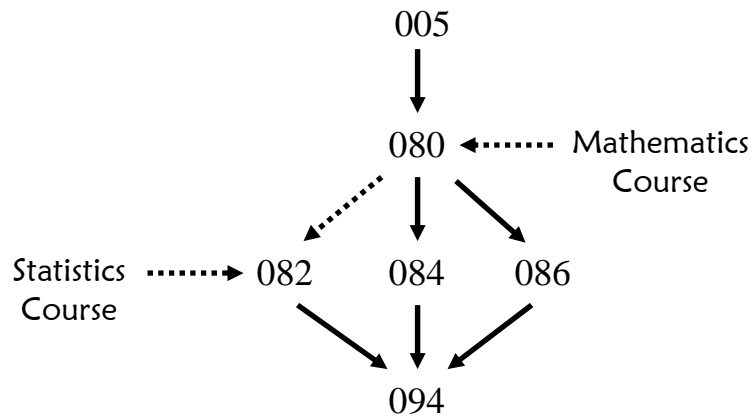
22C:080 will be formally offered for the first time in Spring 2008. Students may receive credit for 22C:080 sooner by taking 22C:104 in Summer 2007 or Fall 2007.

22C:082 will be formally offered for the first time in Spring 2008.

22C:084 and 22C:086 will not be formally offered until the 2008-09 academic year. During 2007-08, students may use 6K:182 or 6K:186 to satisfy the 22C:084 requirement, and 6K:184 may be used to satisfy the 22C:086 requirement.

22C:094 will be offered for the first time in academic year 2008-09.

## INFORMATICS COURSE SEQUENCE



*Note: A solid arrow indicates a clear prerequisite course that must be taken before the next course; a dotted arrow indicates a course that must be taken before or with the other course.*

22C:005	Intro to Computer Science
22C:080	Programming for Informatics
22C:082	Human Computer Interaction
22C:084	Databases for Informatics
22C:086	Networking and Security for Informatics
22C:094	Informatics Project