## Computer Science

Learning Goals (p. 344)

Writing in the Discipline (p. 360)

**Department of Mathematics and Computer Science**

**Department Chair:** Christopher Teixeira

**Computer Science Program Faculty: Professors** Moskol, Sanders, Zhou; **Associate Professors** McDowell, Ravenscroft Jr., Sarawagi; **Assistant Professor** Roy

Students **must** consult with their assigned advisor before they will be able to register for courses. *Note:* Students may not count toward the major more than two courses with grades below C-.

Computer Science B.A.

Course Requirements

Courses

|  |  |  |  |
| --- | --- | --- | --- |
| CSCI 211 | Computer Programming and Design | 4 | F, Sp |
| CSCI 212 | Data Structures | 4 | F, Sp |
| CSCI 312 | Computer Organization and Architecture I | 4 | F, Sp |
| CSCI 313 | Computer Organization and Architecture II | 3 | F, Sp |
| CSCI 325 | Organization of Programming Language | 3 | Sp |
| CSCI 401 | Software Engineering | 3 | Sp |
| CSCI 423 | Analysis of Algorithms | 4 | Sp |
| CSCI 435 | Operating Systems and Computer Architecture | 3 | F |

THREE COURSES from

|  |  |  |  |
| --- | --- | --- | --- |
| CSCI 305 | Functional Programming | 4 | F |
| CSCI 415 | Software Testing | 4 | F (even years) |
| CSCI 416 | Human-Computer Interaction Design | 4 | As needed |
| CSCI 422 | Introduction to Computation Theory | 4 | Sp (As needed) |
| CSCI 427 | Introduction to Artificial Intelligence | 3 | As needed |
| CSCI 437 | Introduction to Data and Computer Communications | 3 | As needed |
| CSCI 455 | Introduction to Database Systems | 3 | F (odd years) |
| CSCI 467 | Computer Science Internship | 4 | As needed |
| CSCI 476 | Advanced Topics in Computer Science | 4 | Sp |

Cognates

|  |  |  |  |
| --- | --- | --- | --- |
| MATH 212 | Calculus I | 4 | F, Sp, Su |
| MATH 436 | Discrete Mathematics | 3 | Sp |

IT IS RECOMMENDED that students also take:

|  |  |  |  |
| --- | --- | --- | --- |
| COMM 208 | Public Speaking | 4 | F, Sp |
| ENGL 230 | Writing for Professional Settings | 4 | F, Sp, Su |
| MATH 209 | Precalculus Mathematics | 4 | F, Sp, Su |
| MATH 213 | Calculus II | 4 | F, Sp, Su |
| MATH 315 | Linear Algebra | 4 | F |
| **Total Credit Hours: 44-47** |

Computer Science B.S.

Course Requirements

Courses

|  |  |  |  |
| --- | --- | --- | --- |
| CSCI 211 | Computer Programming and Design | 4 | F, Sp |
| CSCI 212 | Data Structures | 4 | F, Sp |
| CSCI 312 | Computer Organization and Architecture I | 4 | F, Sp |
| CSCI 313 | Computer Organization and Architecture II | 3 | F, Sp |
| CSCI 325 | Organization of Programming Language | 3 | Sp |
| CSCI 401 | Software Engineering | 3 | Sp |
| CSCI 423 | Analysis of Algorithms | 4 | Sp |
| CSCI 435 | Operating Systems and Computer Architecture | 3 | F |

THREE COURSES from

|  |  |  |  |
| --- | --- | --- | --- |
| CSCI 305 | Functional Programming | 4 | F |
| CSCI 415 | Software Testing | 4 | F (even years) |
| CSCI 416 | Human-Computer Interaction Design | 4 | As needed |
| CSCI 422 | Introduction to Computation Theory | 4 | Sp (As needed ) |
| CSCI 427 | Introduction to Artificial Intelligence | 3 | As needed |
| CSCI 437 | Introduction to Data and Computer Communications | 3 | As needed |
| CSCI 455 | Introduction to Database Systems | 3 | F (odd years) |
| CSCI 467 | Computer Science Internship | 4 | As needed |
| CSCI 476 | Advanced Topics in Computer Science | 4 | Sp |

Cognates

## Mathematics

Learning Goals (B.A.) (p. 346)

Learning Goals (M.A.) (p. 349)

Writing in the Discipline (p. 367)

**Department of Mathematics and Computer Science**

**Department Chair:** Christopher Teixeira

**Mathematics Program Faculty: Professors** Abrahamson, Humphreys, La Ferla, Moskol, Sullivan, Teixeira, Zhou; **Associate Professors** Christy, Costa, Gall, Harrop, Kovac, McDowell, Sarawagi, Sparks; **Assistant Professors** Andreozzi, Burke, Burr, Roy, Wang

Students **must** consult with their assigned advisor before they will be able to register for courses.

*Note: Students cannot count toward the major more than two courses with grades below C-.*

Mathematics B.A.

Course Requirements

Courses

|  |  |  |  |
| --- | --- | --- | --- |
| MATH 212 | Calculus I | 4 | F, Sp, Su |
| MATH 213 | Calculus II | 4 | F, Sp, Su |
| MATH 300 | Bridge to Advanced Mathematics | 4 | Sp |
| MATH 314 | Calculus III | 4 | F, Sp |
| MATH 315 | Linear Algebra | 4 | F |
| MATH 411 | Calculus IV | 4 | F (odd years) |
|  |   |  |  |
| MATH 416 | Ordinary Differential Equations | 4 | Sp (as needed) |
|  | -Or- |  |  |
| MATH 417 | Introduction to Numerical Analysis | 4 | Sp (as needed) |
|  |   |  |  |
| MATH 432 | Introduction to Abstract Algebra | 4 | Sp |
| MATH 441 | Introduction to Probability | 4 | F |
| MATH 461 | Seminar in Mathematics | 3 | Sp |

TWO COURSES from

|  |  |  |  |
| --- | --- | --- | --- |
| MATH 416 | Ordinary Differential Equations | 4 | Sp (as needed) |
|  | -Or- |  |  |
| MATH 417 | Introduction to Numerical Analysis | 4 | Sp (as needed) |
|  |   |  |  |
| MATH 418 | Introduction to Operations Research | 3 | Sp (even years) |
| MATH 431 | Number Theory | 3 | F, Sp |
| MATH 436 | Discrete Mathematics | 3 | Sp |
| MATH 445 | Advanced Statistical Methods | 3 | Sp |

Cognates

CHOOSE category A or B below

Category A

ONE COURSE from

CHEM 405 Physical Chemistry I 3 F

CSCI 312 Computer Organization 4 F, Sp

 and Architecture I

CSCI 422 Introduction to Computation 4 Sp (As needed).

 Theory

CSCI 423 Analysis of Algorithms 4 Sp

ECON 314 Intermediate Microeconomic 4 F

 Theory and Applications

ECON 315 Intermediate Macroeconomic 4 Sp

 Theory and Analysis

MGT 249 Business Statistics II 3 F, Sp, Su

MKT 333 Market Research 3 F, Sp

PHIL 305 Intermediate Logic 4 Sp (even years).

Category B

|  |  |  |  |
| --- | --- | --- | --- |
| PHYS 200 | Mechanics | 4 | F |

and either

|  |  |  |  |
| --- | --- | --- | --- |
| CSCI 211 | Computer Programming and Design | 4 | F, Sp |
|  | -Or- |  |  |
| PHYS 201 | Electricity and Magnetism | 4 | Sp |

Prior to enrolling in any mathematics course above 120, all students must have completed the College Mathematics Competency.

Total Credit Hours: 48-54

Courses:

CSCI 415 - Software Testing (4)

Software testing principles, concepts, and techniques are presented within the context of the software development life cycle. Topics include software test design, test process, test management, and software testing tools.

Prerequisite: CSCI 212 or CSCI 315 or consent of department chair.

Offered: Fall (even years).

CSCI 416 - Human-Computer Interaction Design (4)

Introduces students to fundamental concepts and techniques in the design, implementation and evaluation of user interfaces for computers, smart phones and other devices. Students cannot receive credit for both CIS 416 and CSCI 416.

Prerequisite: CIS 352, CSCI 212, or CSCI 315.

Offered: As needed.

CSCI 422 - Introduction to Computation Theory (4)

Computation theory concepts are introduced with applications to lexical analysis, parsing and algorithms. Topics include formal languages, finitestate automata, pushdown automata, Turing machines and undecidability.

Prerequisite: MATH 436.

Offered: Spring (As needed ).

CSCI 423 - Analysis of Algorithms (4)

Techniques for designing algorithms and analyzing their efficiency are covered. Topics include "big-oh" analysis, divide-and-conquer, greedy method, efficient sorting and searching, graph algorithms, dynamic programming, and NP-completeness.

General Education Category: Advanced Quantatitive/Scientific Reasoning

Prerequisite: Either CSCI 212 or CSCI 315; MATH 212; and MATH 436.

Offered: Spring.

CSCI 427 - Introduction to Artificial Intelligence (3)

Fundamental artificial intelligence methods are introduced, including search, inference, problem solving, and knowledge representation. AI applications, such as natural language understanding and expert systems, are introduced.

Prerequisite: CSCI 212 or CSCI 315.

Offered: As needed.

CSCI 435 - Operating Systems and Computer Architecture (3)

Topics include instruction sets, I/O and interrupt structure, addressing schemes, memory management, process management, performance, and evaluation.

Prerequisite: CSCI 313 and either CSCI 212 or CSCI 315.

Offered: Fall.