# Computer Science

**Department of Mathematics and Computer Science**

**Department Chair:** Stephanie Costa

**Computer Science Program Faculty: Associate Professors** Ravenscroft Jr., Sarawagi; **Assistant Professors** El Fouly, Hamouda, Liu, Mello-Stark

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 | F (even years), Sp |
| CSCI 401 | Software Engineering | 3 | F (even years), Sp |
| CSCI 423 | Analysis of Algorithms | 4 | F (odd years), Sp |
| CSCI 435 | Operating Systems and Computer Architecture | 3 | F, Sp (even years) |

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 428 | Machine Learning | 4 | Spring |
| CSCI 437 | Network Architectures and Programming | 4 | 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 | F, 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 | F (even years), Sp |
| CSCI 401 | Software Engineering | 3 | F (even years), Sp |
| CSCI 423 | Analysis of Algorithms | 4 | F (odd years), Sp |
| CSCI 435 | Operating Systems and Computer Architecture | 3 | F, Sp (even years) |

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 428 | Machine Learning | 4 | Spring |
| CSCI 437 | Network Architectures and Programming | 4 | 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

|  |  |  |  |
| --- | --- | --- | --- |
| ENGL 230 | Writing for Professional Settings | 4 | F, Sp, Su |
|  | -Or- |  |  |
| ENGL 231 | Writing for Digital and Multimedia Environments | 4 | As needed |
|  |  |  |  |
| MATH 212 | Calculus I | 4 | F, Sp, Su |
| MATH 213 | Calculus II | 4 | F, Sp, Su |
|  |  |  |  |
| MATH 240 | Statistical Methods I | 4 | F, Sp, Su |
|  | -Or- |  |  |
| MATH 248 | Business Statistics I | 4 | F, Sp, Su |
|  |  |  |  |
| MATH 436 | Discrete Mathematics | 3 | F, Sp |
| PHIL 206 | Ethics | 3 | F, Sp, Su |
|  |  |  |  |

Course Descriptions:

# CSCI - Computer Science

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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 252 or 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, finite-state 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: Fall (odd years), 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 428 – Machine Learning (4)**

Students will learn to develop intelligent systems and analyze data. Topics include supervised, unsupervised and deep learning algorithms. Current packages and tools will be used to solve real-world problems.

Prerequisite: CSCI 212, or CIS 470 and CSCI 157, or consent of department chair.

Offered: Spring.

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, Spring (even years).