# Computer Science

**Department of Computer Science and Information Systems**

**Department Chair:** Lisa Bain

**Computer Science Program Faculty: Associate Professors** El Fouly, Ravenscroft Jr., Sarawagi; **Assistant Professors** 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 209 | Discrete Structures Using Python | 4 | F, Sp |
| CSCI 211 | Computer Programming and Design | 4 | F, Sp |
| CSCI 212W | Data Structures | 4 | F, Sp |
| CSCI 309 | Object-Oriented Design | 4 | F, Sp |
|  |  |  |  |
| CSCI 313 | Computer Organization and Architecture  | 4 | F, Sp |
| CSCI 325 | Organization of Programming Language | 3 | F (even years), Sp |
| CSCI 401W | Software Engineering | 3 | F (even years), Sp |
| CSCI 423 | Analysis of Algorithms | 4 | F (odd years), Sp |
| CSCI 435 | Operating Systems  | 4 | F, Sp (even years) |

THREE COURSES from

|  |  |  |  |
| --- | --- | --- | --- |
| CSCI 305 | Functional Programming | 4 | F |
|  | -OR- |  |  |
| CSCI 402 | Cyber Security Principles | 4 | F, Sp |
|  | -OR- |  |  |
| CSCI 416 | Web Design | 4 | Sp |
| CSCI 415 | Software Testing | 4 | Sp |
|  |  |  |  |
| CSCI 422 | Introduction to Computation Theory | 4 | Sp (As needed) |
| CSCI 427 | Introduction to Artificial Intelligence | 3 | As needed |
| CSCI 428 | Machine Learning | 4 | Sp |
| CSCI 437 | Network Architectures and Programming | 4 | As needed |
| CSCI 455 | Introduction to Database Systems | 4 | F |
| CSCI 467 | Computer Science Internship | 4 | As needed |
| CSCI 476 | Advanced Topics in Computer Science | 4 | Sp |
| Note: Students cannot receive credit for more than ONE from CSCI 305, CSCI 402, and CSCI 416 to satisfy this elective requirement. |

Cognates

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| --- | --- | --- | --- |
| MATH 212 | Calculus I | 4 | F, Sp, Su |
|  |  |  |  |

IT IS RECOMMENDED that students also take:

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| --- | --- | --- | --- |
| 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 |
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|  |  |  |  |

Total Credit Hours: 49-51

Computer Science B.S.

Course Requirements

Courses

|  |  |  |  |
| --- | --- | --- | --- |
| CSCI 209 | Discrete Structures Using Python | 4 | F, Sp |
| CSCI 211 | Computer Programming and Design | 4 | F, Sp |
| CSCI 212W | Data Structures | 4 | F, Sp |
| CSCI 309 | Object-Oriented Design | 4 | F, Sp |
|  |  |  |  |
| CSCI 313 | Computer Organization and Architecture | 4 | F, Sp |
| CSCI 325 | Organization of Programming Language | 3 | F (even years), Sp |
| CSCI 401W | Software Engineering | 3 | F (even years), Sp |
| CSCI 423 | Analysis of Algorithms | 4 | F (odd years), Sp |
| CSCI 435 | Operating Systems | 4 | F, Sp (even years) |

THREE COURSES from

|  |  |  |  |
| --- | --- | --- | --- |
| CSCI 305 | Functional Programming | 4 | F |
|  | -OR- |  |  |
| CSCI 402 | Cyber Security Principles | 4 | F, Sp |
|  | -OR- |  |  |
| CSCI 416 | Web Design | 4 | Sp |
| CSCI 415 | Software Testing | 4 | Sp |
|  |  |  |  |
| CSCI 422 | Introduction to Computation Theory | 4 | Sp (As needed) |
| CSCI 427 | Introduction to Artificial Intelligence | 3 | As needed |
| CSCI 428 | Machine Learning | 4 | Sp |
| CSCI 437 | Network Architectures and Programming | 4 | As needed |
| CSCI 455 | Introduction to Database Systems | 4 | F |
| CSCI 467 | Computer Science Internship | 4 | As needed |
| CSCI 476 | Advanced Topics in Computer Science | 4 | Sp |
| Note: Students cannot receive credit for more than ONE from CSCI 305, CSCI 402, and CSCI 416 to satisfy this elective requirement. |

Cognates

|  |  |  |  |
| --- | --- | --- | --- |
| ENGL 230 | Writing for Professional Settings | 4 | F, Sp, Su |
|  | -Or- |  |  |
| ENGL 231W | 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 |
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| PHIL 206 | Ethics | 3 | F, Sp, Su |
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TWO COURSES from

|  |  |  |  |
| --- | --- | --- | --- |
| MATH 240 | Statistical Methods I | 4 | F, Sp, Su |
| MATH 300W | Bridge to Advanced Mathematics | 4 | Sp |
| MATH 314 | Calculus III | 4 | F, Sp |
| MATH 324 | College Geometry | 4 | F, Sp |
| 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 | F, Sp |
| MATH 445 | Advanced Statistical Methods | 4 | Sp |

ONE OF THE FOLLOWING TWO-COURSE SEQUENCES

|  |  |  |  |
| --- | --- | --- | --- |
| BIOL 111 | Introductory Biology I | 4 | F, Sp, Su |
|  | -And- |  |  |
| BIOL 112 | Introductory Biology II | 4 | F, Sp, Su |
|  |   |  |  |
|  | -Or- |  |  |
|  |   |  |  |
| CHEM 103 | General Chemistry I | 4 | F, Sp, Su |
|  | -And- |  |  |
| CHEM 104 | General Chemistry II | 4 | F, Sp, Su |
|  |   |  |  |
|  | -Or- |  |  |
|  |   |  |  |
| PHYS 101 | Physics for Science and Mathematics I | 4 | F, Sp, Su |
|  | -And- |  |  |
| PHYS 102 | Physics for Science and Mathematics II | 4 | F, Sp, Su |

Note: Connections courses cannot be used to satisfy these requirements.

Note: Eight credit hours from BIOL 111; CHEM 103; MATH 212, MATH 240; or PHYS 101 may be counted toward the Natural Science and Mathematics categories of General Education.

Total Credit Hours: 75-78

CSCI - Computer Science

CSCI 309 - Object-Oriented Design (4)

Students will learn fundamental concepts, techniques and principles in object-oriented analysis and design. Topics include the object-oriented design process, interfaces, inheritance, polymorphism, graphical user interfaces and design patterns.

Prerequisite: CSCI 201 or CSCI 211.

Offered: Fall, Spring.

CSCI 313 - Computer Organization and Architecture (4)

Students investigate combinational and sequential circuits. System architecture including the central processing unit, memory, input/output. MIPS assembly language programming. Input/output and interrupt programming. System performance enhancements including caching and parallelism.

Prerequisite: CSCI 211 and prior or concurrent enrollment in CSCI 209 or CSCI 312.

Offered: Fall, Spring.

CSCI 324 – Dynamic Web Development (4)

Students are introduced to basic concepts, issues, and techniques related to designing, developing, and deploying websites. Technology will include current practice and tools for server-side programming. Programming projects are required.  Students cannot receive credit for both CIS 324 and CSCI 324.

Prerequisite: CSCI 157 or CIS 301, or consent of department chair.

Offered: Fall.

CSCI 325 - Organization of Programming Language (3)

Programming language constructs are presented, with emphasis on the run-time behavior of programs. Topics include language definition, data types and structures, and run-time considerations.

Prerequisite: CSCI 212 or CSCI 212W or CSCI 315.

Offered: Fall (even years), Spring.

CSCI 401W - Software Engineering (3)

The software development process is examined from initial requirements analysis to operation and maintenance. Student teams develop a software system from requirements to delivery, using disciplined techniques. This is a Writing in the Discipline (WID) course.

Prerequisite: CSCI 212 or CSCI 212W or CSCI 315, and CSCI 309, and at least two additional computer science courses at the 300-level or above. or consent of department chair.

Offered: Fall (even years), Spring.

CSCI 402 - Cyber Security Principles (4)

Students will explore topics such as software security, secure programming, network security, cryptography and virtual machines. Students will study cyber security history and the legal discourse surrounding the field.

Prerequisite: CSCI 102 and CSCI 157; or CSCI 211.

Offered: Fall, Spring.

CSCI 410 - Digital Forensics (4)

Students will investigate digital forensic science methods and processes and apply them to the discovery, collection and analysis of evidence. Topics include documenting procedures, securing data and providing expert testimony.

Prerequisite: CSCI 402.

Offered: Fall.

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