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General Information - Undergraduate

# Admissions - Undergraduate

nongovernmental organizations studies, Italian, jazz studies,  Latin American studies, Portuguese, public history, rhetoric and writing and Spanish.

Programs leading to eligibility for certification in bilingual-bicultural education, middle level education and secondary special education are also available.

Professional preparation programs are offered in pre-dental, pre-law, premedical and pre-optometry.

## Bachelor of Fine Arts (B.F.A.)

The B.F.A. degree is offered in the following areas:

•     Art (Studio) *with concentrations in*

•     Ceramics

•     Digital Media

•     Graphic Design

•     Metalsmithing and Jewelry

•     Painting

•     Photography

•     Printmaking

•     Sculpture

•     Art Education *with concentrations in*

•     Ceramics

•     Digital Media

•     Graphic Design

•     Metalsmithing and Jewelry

•     Painting

•     Photography

•     Printmaking

•     Sculpture

## Bachelor of Music (B.M.)

The B.M. degree is offered in

• Music *with concentrations in*

• Music Education

• Performance

## Bachelor of Professional Students (B.P.S.)

The B.P.S. adult degree completion program degree will be offered with the following concentrations:

     Organizational Leadership

     Social Services

## Bachelor of Science (B.S.)

The B.S. degree is offered in the following areas:

•     Accounting

•     Art Education

•     Behavioral Health Studies

•     Biology

•     Chemistry *with concentrations in*

•     Biological Chemistry

•     Environmental Chemistry

•     Professional Chemistry

•     Community and Public Health Promotion *with concentrations in*

•     Health and Aging

•     Public Health Promotion

•     Women’s Health

•     Computer Information Systems

•     Computer Science

* Cybersecurity

•     Data Science

•     Early Childhood Education *with concentrations in*

•     Teaching

•     Community Programs

•     Birth to Three

•     Finance

•     Health Care Administration

•     Health Education

•     Health Sciences

•     Health Sciences *with concentrations in*

•     Dental Hygiene Completion

•     Human Services

•     Medical Laboratory Sciences

•     Respiratory Therapy Completion

•     Management *with concentrations in*

•     General Management

•     Human Resource Management

•     Operations Management

•     Marketing

•     Medical Imaging *with concentrations in*

•     Nuclear Medicine Technology

•     Radiologic Technology

•     Certified RT Computed Tomography

•     Certified Medical Imager Management

•     Certified RT Vascular Interventional Radiography

•     Diagnostic Medical Sonography

•     Physical Education

•     Physics

•     Special Education *with teaching concentrations in*

•     Elementary Special Education

4-Faculty-of-Arts-and-Sciences

|  |  |  |
| --- | --- | --- |
|  | B.A. | Environmental Chemistry |
|   | B.S. | Biochemistry  |
|   | B.S. | Environmental Chemistry |
|   | B.S. | Professional Chemistry |
| Communication (p. ) | B.A. | Journalism |
|   | B.A. |  Media Communication  |
|   | B.A. | Public and Professional Communication |
|   | B.A. | Public Relations and Advertising |
|   | B.A. | Speech, Language, and Hearing Science |
| Computer Information Systems (p. ) | B.S. |   |

|  |  |  |
| --- | --- | --- |
| Computer Science (p. ) | B.A. |   |
| Computer Science (p. ) | B.S. |   |
| Cybersecurity (p. ) | B.S. |  |
| Dance Performance (p. ) | B.A. |   |
| Data Science (p. ) | B.S. |   |
| English\*\* (p. ) | B.A. |   |

|  |  |  |
| --- | --- | --- |
|   | B.A. | Creative Writing |
|   | B.A. | Professional Writing |
| Environmental Studies  (p. ) | B.A.  |   |
| Film Studies (p. ) | B.A. |   |
| Gender and Women’s Studies (p. ) | B.A. |   |
| Geography (p. ) | B.A. |   |
| Global Studies  (p. ) | B.A.  |   |
| Health Sciences (p. ) | B.S. |   |
|   | B.S. | Dental Hygiene Completion |
|   | B.S. | Human Services |

# Cybersecurity

**Department of Computer Science and Information Systems**

**Department Chair:** Suzanne Mello-Stark

**Cybersecurity / Computer Information Systems Program Faculty: Professor**Bain**; Associate Professor**Aydogdu; **Assistant Professor** Perry, Wood
**Cybersecurity / Computer Science Program Faculty**:

**Associate Professor**Liu, Mello-Stark

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

cybersecurity B.S.

Course Requirements

Courses

|  |  |  |  |
| --- | --- | --- | --- |
| CSCI 102CSCI 157 or CIS 301 | Computer Fundamentals for CybersecurityIntroduction to Algorithmic Thinking in Python or Introduction to Computer Programming in Business | 44 | F, SpF, Sp |
| CIS 252 | Introduction to Information Systems | 4 | F, Sp, Su |
| CIS 320CIS 347CSCI 402CSCI 410 | Information Technology: Hardware and Software SystemsBasic Cryptography TechniquesCyber Security PrinciplesDigital Forensics | 4444 | SpF, SpF, SpF |
| CIS 421CSCI 432 | Networks and InfrastructureNetwork and Systems Security |  44 | F, SpSp |
| CIS 440 | Issues in Computer Security | 4 | F, Sp |
| CIS 462W | Applied Software Development Project | 4 | F, Sp |

and TWO ADDITIONAL COURSES in computer information systems or computer science at the 300-level or above (for a total of 8 credits.)

COGNATES

|  |  |  |  |
| --- | --- | --- | --- |
| MGT 201W | Foundations of Management | 4 | F, Sp, Su |
| MATH 177 | Quantitative Business Analysis | 4 | F, Sp, Su |
| MATH 248 | Business Statistics I | 4 | F, Sp, Su |
|  |  |  |  |
| PHIL 206 | Ethics | 3 | F, Sp, Su |
|  | -Or- |  |  |
| PHIL 207 | Technology and the Future of Humanity | 3 | F, Sp |

Note: MATH 177: Fulfills the Mathematics category of General Education.

Note: MATH 248: Fulfills the Advanced Quantitative Scientific Reasoning category of General Education.

Total Credit Hours: 67

cybersecurity Minor

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

Course Requirements

A minor in cybersecurity consists of a minimum of 20 credit hours (five courses), as follows:

Courses

|  |  |  |  |
| --- | --- | --- | --- |
| CSCI 102 | Computer Fundamentals for Cyber Security | 4 | F, Sp |
| CSCI 157 | Introduction to Algorithmic Thinking in Python | 4 | F, Sp |
| CSCI 402 | Cyber Security Principles | 4 | F, Sp |
| CSCI 410 | Digital Forensics | 4 | F |
| CSCI 432 | Network and Systems Security | 4 | Sp |

Total Credit Hours: 20

**NOTE for CATALOG: currently the Cybersecurity Minor is listed under the Computer Science programs between the Computer Science Minor and the Web Development Minor, now that we have a separate Cybersecurity Major in its own section, the Cybersecurity Minor will just be listed here and can be deleted from the Computer Science programs.**

9-Course Descriptions:

# CSCI - Computer Science

CSCI 102 - Computer Fundamentals for Cyber Security (4)

Students will learn the technical details necessary to study cyber security. Topics include binary and hexadecimal, operating systems, hardware and software, networking, memory, storage management and databases.

Prerequisite: Completed college mathematics competency.

Offered: Fall, Spring.

CSCI 157 - Introduction to Algorithmic Thinking in Python (4)

This course introduces algorithmic thinking and computer programming in the Python programming language. Topics include algorithms, flowcharts, top-down design, selection, repetition, modularization, input-output, and recursion.

Prerequisite: Completed college mathematics competency.

Offered: Fall, Spring.

CSCI 209 - Discrete Structures Using Python (4)

Students will explore computer science topics in programming, algorithms, compilers, networks and cryptography. Fundamental mathematical concepts like finite=state machines, recurrence relations, graphs and probability will be applied using Python programs.

Prerequisite: CSCI 157 and MATH 120 or appropriate score on placement exam.

Offered: Fall, Spring.

CSCI 211 - Computer Programming and Design (4)

Fundamentals of problem specification, program design, and algorithm development are taught in the Java programming language. Topics include functions, selection, iteration, recursion, arrays, classes, and inheritance.

Prerequisite: CSCI 157 or consent of department chair.

Offered: Fall, Spring.

CSCI 212W - Data Structures (4)

Abstract datatypes and data structures are presented. Topics include time complexity, linked lists, stacks, queues, lists, hashing, trees, heaps, searching, sorting, and development of object-oriented programming techniques. This is a Writing in the Discipline (WID) course.

Prerequisite: CSCI 211 or CSCI 221.

Offered: Fall, Spring.

CSCI 302 - C++ Programming (3)

The fundamental concepts and constructs of the C++ programming language are examined. Topics include expressions, input/output, control structures, classes, inheritance, arrays, strings, and templates.

Prerequisite: CSCI 211 or CSCI 221.

Offered: As needed.

CSCI 305 - Functional Programming (4)

Functional programming focuses on the design process from problems to well-organized solutions. Topics include, design recipes, functions, lists, self-referential data structures, recursion, lambda functions, and abstraction with practical applications.

Prerequisite: CSCI 201 or CSCI 211 or equivalent, or consent of department chair.

Offered: As needed.

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 209 or CSCI 312; and CSCI 212 or CSCI 212W.

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 309 or CSCI 315, 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](https://ric.smartcatalogiq.com/en/2022-2023/Catalog/Courses/CSCI-Computer-Science/100/CSCI-102%22%20%5Ct%20%22_blank) and [CSCI 157](https://ric.smartcatalogiq.com/en/2022-2023/Catalog/Courses/CSCI-Computer-Science/100/CSCI-157%22%20%5Ct%20%22_blank) or CIS 301; or [CSCI 211](https://ric.smartcatalogiq.com/en/2022-2023/Catalog/Courses/CSCI-Computer-Science/200/CSCI-211%22%20%5Ct%20%22_blank); and 45 credits; or consent of department chair

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.

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 212W, or CSCI 315, or consent of department chair.

Offered: Spring.

CSCI 416 - Web Design (4)

Students are introduced to concepts, issues and techniques related to designing website interfaces using a variety of tools. Study includes HTML, CSS, and JavaScript. Students cannot receive credit for both CIS 416 and CSCI 416.

Prerequisite: CSCI 157 or CIS 301.

Offered: Spring.

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: CSCI 209 or MATH 436; either CSCI 212 or CSCI 212W, or CSCI 315; and MATH 212.

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 212W or CSCI 315.

Offered: As needed.

CSCI 428 - Machine Learning ()

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

Offered: Spring

CSCI 432 - Network and Systems Security (4)

Students will study a survey of network and systems security topics such as packet analysis, penetration testing and intrusion detection. Students will practice with tools/techniques used by security professionals.

Prerequisite: CSCI 402.

Offered: Spring.

CSCI 435 - Operating Systems (4)

Students explore topics of modern operating systems such as process management and synchronization, CPU scheduling and memory management. Emphasis is placed on increasing OS performance, while enhancing privacy and security.

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

Offered: Fall, Spring (even years).

CSCI 437 - Network Architectures and Programming (4)

An introduction to fundamental concepts of computer networks. Topics include the internet reference model, TCP/IP, flow control, congestion control, routing, switching, network programming, and data capturing and analysis.

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

Offered: As needed.

CSCI 455 - Introduction to Databases (4)

Students explore the fundamental concepts of database systems. Topics include relational databases, database modeling and design, SQL, query processing and optimization, distributed and noSOL, databases and database security.

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

Offered: Fall.

CSCI 467 - Computer Science Internship (4)

Students work at a business or nonprofit organization integrating classroom study with work-based learning, supervised by a faculty member.

Prerequisite: Major in computer science, minimum GPA of 2.67 in computer science courses, completion of or concurrent enrollment in CSCI 401 or CSCI 401W, and consent of department chair.

Offered: As needed.

CSCI 476 - Advanced Topics in Computer Science (4)

Recent developments and topics of current interest in computer science are studied. This course may be repeated for credit with a change in content.

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

Offered: Spring.

CSCI 490 - Directed Study in Computer Science (1-4)

This course is open to students who have demonstrated superior ability in computer science. Designed to be a substitute for a traditional course under the instruction of a faculty member. This course may be repeated for credit once with a change in content.

Prerequisite: Consent of instructor, department chair and dean.

Offered: As needed.

# CIS - Computer Information Systems

CIS 252 - Introduction to Information Systems (4)

Information systems are an integral part of all business activities and careers. This course introduces students to contemporary information systems and demonstrates how these systems are used throughout global organizations. (Formerly CIS 352 Management Information Systems.)

Prerequisite: Completion of 15 college credits.

Offered: Fall, Spring, Summer

CIS 301 - Introduction to Computer Programming in Business (4)

Introductory course using an object-oriented programming language to solve business problems. Topics include: algorithm concepts and development; object-oriented programming methodologies; graphical interface design and event based programming.

Prerequisite: CIS 252 or CSCI 102 or consent of department chair.

Offered: Fall, Spring.

CIS 302 - Intermediate Computer Programming in Business (4)

Prerequisite: CIS 255, CIS 256, CIS 257, or CIS 301.

Offered: As needed.

CIS 320 - Information Technology: Hardware and Software Systems (4)

The evolution of the major subsystems of computer hardware, technical knowledge of the integration of hardware, and selected operating systems software are examined.

Prerequisite: CIS 252 or CSCI 102 or consent of department chair.

Offered: Spring.

CIS 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.

CIS 347 Basic Cryptography Techniques

Students study cryptography techniques and how it protects data. Topics include public-key encryption, hash functions and asymmetric/asymmetric encryption. Students perform attacks and study the latest protocols and standards.

Prerequisite: Math 177, CIS 301 or CSCI 157

Offered: Fall, Spring

CIS 350 - Special Topics (4)

New courses are offered by faculty to present latest computer information materials.

Prerequisite: CIS 251 or CIS 252 or consent of department chair.

Offered: As needed.

CIS 351 - Advanced Office Applications for Business (4)

Advanced applications of Office Suite software are examined. Applications include database, spreadsheet, word processing, and presentation graphics.

Prerequisite: CIS 251 or CIS 252 or consent of department chair.

Offered: As needed.

CIS 358 - Mobile Application Development (4)

Students are introduced to mobile application design concepts and programming components. These concepts and components include simple mobile programs (e.g. canvas, animation and games); global variables and conditionals; procedures; and procedures with parameters, lists and tiny database.

Prerequisite: CIS 251 or CIS 252 and completion of 60 college credits.

Offered: As needed.

CIS 416 - Web Design (4)

Students are introduced to concepts, issues and techniques related to designing website interfaces using a variety of tools. Study includes HTML, CSS, and JavaScript. Students cannot receive credit for both CIS 416 and CSCI 416.

Prerequisite: CSCI 157 or CIS 301.

Offered: Spring.

CIS 421 - Networks and Infrastructure (4)

Both computer and systems architecture and communications networks are presented with a focus on the services and capabilities that information technology infrastructure solutions enable in an organizational context.

Prerequisite: CIS 252 or CSCI 102 and completion of 45 credits or consent of department chair.

Offered: Fall, Spring.

CIS 440 - Issues in Computer Security (4)

Students evaluate organizational and technological methods employed to provide security for computer software, hardware, and data. Topics include controlling for error, natural disaster, and intentional attacks.

Prerequisite: CIS 252 or CSCI 102 and completion of 45 credits, or consent of department chair.

Offered: Fall, Spring.

CIS 453 - This course has been deleted. See program director for substitute course. (Systems Analysis and Design) (3)

CIS 455W - Database Programming (4)

The basic components of file and communication systems as they support information systems are surveyed. This is a Writing in the Discipline (WID) course.

Prerequisite: CIS 252 or CSCI 102 or MATH 245, AND CIS 301 or CSCI 157, or consent of department chair.

Offered: Fall, Spring.

CIS 462W - Applied Software Development Project (4)

This is a practicum in the application of programming and systems-development concepts, resulting in a comprehensive systems-development project. This is a Writing in the Discipline (WID) course.

Prerequisite: CIS 301 or CSCI 157, AND CIS 455 or CIS 455W or CSCI 432, or consent of department chair.

Offered: Fall, Spring.

CIS 467 - Directed Internship (4)

Students are assigned to a business, an industrial organization, or a not-for-profit organization and supervised by a mentor. Students receive 1 credit hour for every four hours of work. A two-hour biweekly seminar is included. Graded S, U.

Prerequisite: Major in computer information systems and completion of at least 60 college credits.

Offered: Fall, Spring, Summer.

CIS 470 - Introduction to Data Analytics (4)

Domain knowledge in mathematics, statistics, machine learning and databases that pertains to specific data and information extraction are introduced. Students use these tools to solve unstructured problems.

Prerequisite: CIS 252 or CIS 352, CIS 301 or CSCI 157 and MATH 248 or MATH 240, or consent of department chair

Offered: Fall.

CIS 472 - Data Visualization (4)

This course introduces algorithms and techniques for effective data visualizations based on data science principles, graphic and communication design, visual art, perceptual and cognitive science. Data visualization tools are introduced.

Prerequisite: CIS 252 or CIS 352, CIS 301 or CSCI 157 and MATH 248 or MATH 240, or consent of department chair.

Offered: As needed.

CIS 490 - Directed Study (4)

Designed to be a substitute for a traditional course under the instruction of a faculty member.

Prerequisite: Consent of instructor, department chair and dean.

Offered: As needed.

CIS 491 - Independent Study I (4)

This course emphasizes the development of research for students admitted to the computer information systems honors program. The research topic is selected and conducted under the mentorship of a faculty advisor.

Prerequisite: Admission to the CIS honors program and consent of instructor, department chair and dean.

Offered: As needed.

CIS 492 - Independent Study II (4)

This course continues the development of research begun in CIS 491. The honors research is completed under the consultation of a faculty advisor. A research paper and presentation are required.

Prerequisite: CIS 491 and consent of instructor, department chair and dean.

Offered: As needed.

CIS 535 - Data Management (3)

Various techniques are explored for the management of the design and development of database systems. Issues in the creation and use of logical data models, database administration, and concurrent processing are explored.

Prerequisite: Graduate status and senior standing or consent of department chair.

Offered: As needed.

CIS 541 - Legal Aspects of Information Technology (3)

The legal environment within which an organization must conduct its electronic commerce is reviewed. Legal liability for data transmission and exchange is also explored.

Prerequisite: Graduate status and senior standing or consent of department chair.

Offered: As needed.

CIS 542 - Electronic Commerce (3)

The systems and management challenges and the opportunities and successful strategies required to develop and maintain electronic commerce are examined. Marketing, strategy, infrastructure design, and server management are also covered.

Prerequisite: Graduate status and senior standing or consent of department chair.

Offered: As needed.

CIS 543 - Decision Support Systems (3)

The decision-making process is examined, with emphasis on dealing with incomplete and inexact data, including unstructured environments. The use of data management, modeling, and simulation are explored.

Prerequisite: Graduate status and senior standing or consent of department chair.

Offered: As needed.