Computer Science

Faculty/Staff

Daryl D. Thomas, Chair

Adjunct: Keith Beucler; David Mendoza

Aims of the Department

The primary mission of the Department of Computer Science is to prepare students for professional work in the field of computer science, within a Christian context. A secondary mission of the Department is to provide service courses in computer science to the University community at-large.

The Department of Computer Science offers both a Bachelor of Science in Computer Science and a Bachelor of Science in Computer Science with emphasis in Cybersecurity. Both degrees are intended for students who wish to pursue careers in computer science, either in industry or in academia. The Department also offers a minor in Computer Science.

Computer Science Degrees and Certificates

B.S. Computer Science

General Education Requirements for all Bachelor's degrees

Quality Enhancement Plan (QEP) Requirement

In addition to the course requirements set forth below, each student seeking a B.S. in Computer Science must successfully develop and release a useful program under an open-source model.

We strongly suggest that students seeking the Bachelor of Science in Computer Science plan to take their computer science courses in the following sequence:

Bachelor of Science	
Freshman — Fall Semester	CSIS 110, CSIS 125
Freshman — Spring Semester	CSIS111, CSIS 225
Sophomore — Fall Semester	CSIS 201, CSIS 211, CSIS 245
Sophomore — Spring Semester	CSIS 215, CSIS 255
Junior — Fall Semester	CSIS 360, CSIS 450, CSIS 495
Junior — Spring Semester	CSIS 375, CSIS upper-division elective
Senior — Fall Semester	CSIS 315, CSIS upper-division elective
Senior — Spring Semester	CSIS 490, CSIS 405

Required Courses

Item #	Title	credits
CSIS 110	Principles of Computer Programming I	3
CSIS 111	Principles of Computer Programming II	3
CSIS 125	Discrete Structures I	3
CSIS 201	Information Literacy for CS Majors	1
CSIS 211	Data Structures and Algorithms	3
CSIS 215	Object-Oriented Programming in C++	3
CSIS 225	Discrete Structures II	3
CSIS 245	Introduction to Local Area Network Technology	4
CSIS 255	Issues and Practices in Information Security	3
CSIS 315	Application Development for Event-Driven GUI Applications	3
CSIS 360	Operating Systems	3
CSIS 375	Introduction to Robotic Systems	4
CSIS 405	Formal Languages and Automata	3
CSIS 450	Principles of Database Design	3
CSIS 490	Software Engineering	3
CSIS 495	Special Topics Seminar	3
	CSIS Electives Upper Division	6

Required Cognates

Item #	Title	credits
COMM 115	Group Communication	3
MATH 141	Introduction to Probability and Statistics	3
	Total credits:	**60**

Category Descriptions

CSIS Electives Upper Division

Credits: 6

Item #	Title	credits
CSIS 492	Computer Science Internship	3
CSIS 495	Special Topics Seminar	3

B.S. Computer Science, Emphasis in Cybersecurity

General Education Requirements for all Bachelor's degrees

Quality Enhancement Plan (QEP) Requirement

In addition to the course requirements set forth below, each student seeking a B.S. in Computer Science with Emphasis in Cybersecurity must satisfy the requirements for the A.S. in Computer Science, as well as successfully develop and release a useful program under an open-source model.

Required Courses

Item #	Title	credits
CSIS 110	Principles of Computer Programming I	3
CSIS 111	Principles of Computer Programming II	3
CSIS 125	Discrete Structures I	3
CSIS 201	Information Literacy for CS Majors	1
CSIS 211	Data Structures and Algorithms	3
CSIS 215	Object-Oriented Programming in C++	3
CSIS 225	Discrete Structures II	3
CSIS 245	Introduction to Local Area Network Technology	4
CSIS 255	Issues and Practices in Information Security	3
CSIS 360	Operating Systems	3
CSIS 367	System & Network Hardening	3
CSIS 375	Introduction to Robotic Systems	4
CSIS 405	Formal Languages and Automata	3
CSIS 467	Cyber Forensics & Analysis	3
CSIS 490	Software Engineering	3
CSIS 492	Computer Science Internship	3
BUAD 202	Introduction to Contemporary Business	3
CRIJ 311	Criminal Investigations	3

Required Cognates

Item #	Title	credits
COMM 115	Group Communication	3
MATH 141	Introduction to Probability and Statistics	3

Curriculum Guide, Bachelor of Science, Computer Science, Cybersecurity Emphasis

We strongly suggest that students seeking the Bachelor of Science in Computer Science with Emphasis in Cybersecurity plan to take their computer science courses in the following sequence:

Freshman Year, Fall Semester

Item #	Title	credits
CSIS 110	Principles of Computer Programming I	3
CSIS 125	Discrete Structures I	3

Freshman Year, Spring Semester

Item #	Title	credits
CSIS 111	Principles of Computer Programming II	3
CSIS 225	Discrete Structures II	3

Sophomore Year, Fall Semester

Item #	Title	credits
CSIS 201	Information Literacy for CS Majors	1
CSIS 211	Data Structures and Algorithms	3
CSIS 245	Introduction to Local Area Network Technology	4

Sophomore Year, Spring Semester

Item #	Title	credits
CSIS 215	Object-Oriented Programming in C++	3
CSIS 255	Issues and Practices in Information Security	3

Junior Year, Fall Semester

Item #	Title	credits
CSIS 360	Operating Systems	3
BUAD 202	Introduction to Contemporary Business	3
CRIJ 311	Criminal Investigations	3

Junior Year, Spring Semester

Item #	Title	credits
CSIS 375	Introduction to Robotic Systems	4
CSIS 367	System & Network Hardening	3

Senior Year, Fall Semester

Item #	Title	credits
CSIS 492	Computer Science Internship	3
CSIS 467	Cyber Forensics & Analysis	3

Senior Year, Spring Semester

Item #	Title	credits
CSIS 405	Formal Languages and Automata	3
CSIS 490	Software Engineering	3
	Total credits:	**60**

Minor in Computer Science

Required Courses

Item #	Title	credits
CSIS 110	Principles of Computer Programming I	3
CSIS 111	Principles of Computer Programming II	3
CSIS 125	Discrete Structures I	3
CSIS 211	Data Structures and Algorithms	3
CSIS 215	Object-Oriented Programming in C++	3
CSIS 225	Discrete Structures II	3
CSIS 245	Introduction to Local Area Network Technology	4
	Total credits:	**22**

Computer Science Classes

CSIS 105: Introduction to Computing

An overview of computing as a human activity emphasizing the use of computers as tools to meet the needs of individuals and groups. Topics for study and discussion will include the history and development of computers, the impact of computers on the quality of life, information processing using computers, and ethical issues with respect to the use of information.

Credits: 3
Program: Computer Science
Semester Offered: Spring

CSIS 106: Comprehensive Spreadsheets

This course is a comprehensive coverage of basic, and advanced spreadsheet software including, but not limited to, the set of skills on Microsoft's certification exams for Excel

Credits: 3
Program: Computer Science
Semester Offered: Spring

CSIS 110: Principles of Computer Programming I

Introduction to problem solving using computers. Topics include top-down design, algorithm development, information representation, and programming. Assumes a basic knowledge of PC operation.

Credits: 3
Program: Computer Science
Semester Offered: Fall

CSIS 111: Principles of Computer Programming II

A continuation of CSIS 110 with emphasis on elementary data structures and advanced techniques. Students will be introduced to C++.

Credits: 3
Prerequisites:
CSIS 110
Program: Computer Science
Semester Offered: Spring

CSIS 125: Discrete Structures I

An introduction to the basics of discrete mathematics as applied in computer science. Topics include elementary logic, propositional logic, predicate logic, proof techniques, sets, relations, functions, elementary number theory, and Boolean algebra.

Credits: 3
Co-Requisites:
Students must also register for CSIS 125T
Program: Computer Science
Semester Offered: Fall

CSIS 201: Information Literacy for CS Majors

An introduction to the research methods, documentation techniques, and publication styles commonly used in the field of computer science. Specific topics to be covered will include: the software development process, trends in computer science research, the peer review process, quality evaluation of sources, IEEE publication guidelines, the IEEE style manual, and the portfolio development process.

Credits: 1
Prerequisites:
ENGL 121
Program: Computer Science
Semester Offered: Fall

CSIS 211: Data Structures and Algorithms

A continuation of CSIS 111's study of data structures, and a study of the time-complexity of algorithms. There will be an emphasis on choosing the appropriate storage arrangement and the appropriate algorithms to manipulate data, both in high-speed memory, on mass storage devices, or using a combination of the two.

Credits: 3
Prerequisites:
CSIS 111
CSIS 125
Program: Computer Science
Semester Offered: Fall

CSIS 215: Object-Oriented Programming in C++

A study of the strategic object-oriented approach to problem solving — analysis, design and coding — using the C++ language. There will be a focus on the use of classes to implement abstract data types, thus supporting the modern approach to loosely linked, modular code. The overloading of functions and operators, inheritance, and polymorphism will be studied as abstraction tools.

Credits: 3
Prerequisites:
CSIS 111
or Instructor's approval
Program: Computer Science
Semester Offered: Spring

CSIS 225: Discrete Structures II

A continuation of the study of discrete structures begun in CSIS 125. Topics include recurrence relations, graphs and trees, matrices, combinatorics, computational complexity, and elementary computability.

Credits: 3
Prerequisites:
CSIS 125
Program: Computer Science
Semester Offered: Spring

CSIS 245: Introduction to Local Area Network Technology

A practical introduction to current LAN network technologies, with emphasis on Ethernet. Topics include: signal encoding, channel access/utilization, integration/configuration/ operation of hardware, cabling, protocols, and LAN operating systems.

Credits: 4
Prerequisites:
CSIS 111
CSIS 225
Program: Computer Science
Semester Offered: Fall

CSIS 255: Issues and Practices in Information Security

An examination of the issues to be considered and practices typically employed when implementing security measures to protect computing resources and data. Topics to be considered include basics of computation and networking, as well as securing communications channels, computer systems, and information resources.

Credits: 3
Prerequisites:
CSIS 110
or permission of instructor
Program: Computer Science
Semester Offered: Spring

CSIS 298: Individual Study Topics

Designed for the student who wishes to do independent study or research. Content and method of study must be arranged prior to registration. May be repeated for a total of 6 credits.

Credits: 1-3
Prerequisites:
Permission of Department Chair
Program: Computer Science

CSIS 315: Application Development for Event-Driven GUI Applications

An introduction to the event-driven programming model using a windowed graphical user interface. Emphasis will be on using available tools and libraries to speed the development of significant applications.

Credits: 3
Prerequisites:
CSIS 215
Program: Computer Science
Semester Offered: Fall

CSIS 360: Operating Systems

A study of operating system organization, job control, I/O, and resource management. Emphasis will be placed on features of the Linux O/S.

Credits: 3

Prerequisites:
CSIS 211
Program: Computer Science
Semester Offered: Fall

CSIS 367: System & Network Hardening

An in-depth examination of attack and defense methodologies for systems and networks. Practical emphasis on defense of these systems, and how attacks are executed.

Credits: 3
Prerequisites:
CSIS 245
CSIS 255
Program: Computer Science
Semester Offered: Spring

CSIS 375: Introduction to Robotic Systems

An overview of the field of robotics, with emphasis on autonomous mobile robotic systems. Topics include sensing, localization, mapping, navigation, obstacle avoidance, feedback-based control, human safety issues, and moral implications of robotic systems. Lecture and laboratory.

Credits: 4
Prerequisites:
CSIS 111
Program: Computer Science
Semester Offered: Spring

CSIS 405: Formal Languages and Automata

A study of formal language theory, with emphasis on regular and context-free grammars. Topics include: language properties, the Chomsky Hierarchy, Finite State Machines, PDAs, Turing machines, uncomputability, and computational complexity.

Credits: 3
Prerequisites:
CSIS 225
Program: Computer Science
Semester Offered: Spring

CSIS 450: Principles of Database Design

Course covers design and implementation of databases with emphasis on structures and schemas, information retrieval, SQL, security, and integrity.

Credits: 3
Prerequisites:
CSIS 211
Program: Computer Science
Semester Offered: Fall

CSIS 467: Cyber Forensics & Analysis

This course explores the fundamental process of analyzing data collected from electronic devices. Students will be introduced to proper techniques and tools utilized for securing, handling, and preserving digital evidence.

Credits: 3
Prerequisites:
CSIS 367
Program: Computer Science
Semester Offered: Fall

CSIS 490: Software Engineering

A study of the management and implementation of programming projects. Topics include project management, scheduling and control, programming assignments and specifications, testing and documentation, system implementation, and evaluation. Students will be required to complete a significant team project involving both design and implementation.

Credits: 3
Prerequisites:
CSIS 215
Program: Computer Science
Semester Offered: Spring

CSIS 492: Computer Science Internship

On-the-job supervised experience in a field of computer science related to the student's concentration area. Limited to senior majors. May be repeated for a total of 6 credits.

Credits: 3
Prerequisites:
Approval by department chair
Program: Computer Science

CSIS 495: Special Topics Seminar

Covers topics of special interest such as new developments in the field of computer science, as well as occasional specialized topics such as artificial intelligence, computer graphics, etc. May be repeated for a total of 6 credits.

Credits: 3
Prerequisites:
Approval by department chair
Program: Computer Science

CSIS 498: Individual Study Topics

Designed for the student who wishes to do independent study or research. Content and method of study must be arranged prior to registration. May be repeated for a total of 6 credits.

Credits: 1-3
Prerequisites:
Approval by Department Chair
Program: Computer Science