

Computer Science Program

Faculty/Staff

Daryl D. Thomas, Chair; Miguel Espinosa,

Adjunct: Judith F. Miles

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 bachelor of science degree and associate of science degree programs. The Bachelor of Science in Computer Science is intended for students who wish to pursue careers in computer science, either in industry or in academia. The Associate of Science in Computer Science offers students the opportunity to earn a valuable credential midway to completion of a Bachelor of Science in Computer Science. The Department also offers a minor in Computer Science.

Computer Science Degrees and Certificates

A.S. Computer Science

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

| Associate in 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 |

In addition to completing the courses below, students seeking the A.S. must pass Department-specified external certification examinations in the areas of security and networking in order to be awarded the degree.

Program:

Computer Science

Type:

A.S.

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 |
| Sub-Total Credits | | 26 |
| Total credits for degree: | | 26 |

B.S. Computer Science

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 495, CSIS 450 |
| Junior — Spring Semester | CSIS 360, CSIS 375, CSIS upper division elective |
| Senior — Fall Semester | CSIS 315, CSIS upper division elective |
| Senior — Spring Semester | CSIS 490, CSIS 405 |

Program:

Computer Science

Type:

B.S.

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 | 1 - 3 |
| | CSIS Electives Upper Division | 6 |
| | Sub-Total Credits | 54 |

Required Cognates

| Item # | Title | Credits |
|----------|--|----------|
| COMM 115 | Discussion Techniques | 3 |
| MATH 141 | Introduction to Probability and Statistics | 3 |
| | Sub-Total Credits | 6 |

| | | |
|--|---------------------------|----|
| | Total credits for degree: | 60 |
|--|---------------------------|----|

Minor in Computer Science

Program:

Computer Science

Type:

Minor

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 |
| Sub-Total Credits | | 22 |
| Total credits for degree: | | 22 |

Computer Science Classes

CSIS 102: Computer Literacy and Applications

An introduction to the use of microcomputers, oriented toward future microcomputer users, not computer specialists. Topics include history of the field, computer hardware, software, operating systems, the Internet, and information systems. Students will work with popular applications for business and personal use, including web browsers, word processors, spreadsheets, and databases.

Credits: 3

Program: [Computer Science](#)

Semester Offered: Fall, Spring

CSIS 104: Spreadsheet and Database Applications

A one-hour computer applications course focusing on developing spreadsheet and relational database skills. It will include a brief review of word processing, digital presentation techniques, and computer concepts. Students will use realistic examples that emphasize how databases and spreadsheets can be used to increase productivity.

Credits: 1

Program: [Computer Science](#)

Semester Offered: Fall, 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

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: Spring

CSIS 370: Programming Languages

Comparative study of programming languages with emphasis on formal language specification and analysis, run-time behavior, and implementation.

Credits: 3

Prerequisites: [CSIS 211](#)

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 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 315](#)
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: 1 - 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: 1 - 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](#)