

Computer Information Science

Overview

The Folsom Lake College educational curriculum in computing consists of courses, certificates, and degrees in a variety of areas related to computing. Individual courses are organized into several groups related to computer application user skills (CISA), general "core" topics (CISC), computer networking (CISN), computer programming (CISP), computer security (CISS), and the web (CISW). Students interested in pursuing a certificate or degree may choose from a variety of educational programs. These educational programs are organized into two groups:



Computer Science and Programming

What is Computer Science?

New technology creates the future. Computer scientists use a body of skills and knowledge to create these new computer hardware and software technologies. Computer scientists are technically educated professionals and can be found working in many fields as programmers and designers, as experts in the use of technology in other fields, and as managers in a variety of organizations.

Computer science as a field of study encompasses the following subareas: algorithms and data structures, programming languages, hardware and software architecture, software engineering, databases, artificial intelligence and robotics, computer animation and graphics, computer games, networks, security, and bioinformatics.

Academic Programs

Help create the technological future of computing. The Folsom Lake College academic programs in computer science and programming provide comprehensive exposure to computer science in preparation for upper-division computer science courses, and preparation for entry-level employment in government, business, and computer-related industries.

Career Options

- Computer Engineer
- Computer Technologist
- Firmware Engineer
- Programmer
- Software Architect
- Software Engineer
- Software Verification & Testing
- Systems Analyst

- Systems Designer
- Technical Manager
- Technician

Many of these options require a bachelor's degree, although some entry-level opportunities exist for individuals with an associate degree or certificate.

Highlights

- A great foundation for entry to university
- A broad-based technical education
- State-of-the-art computer facilities
- Study in a field that has great employment opportunities and encompasses many careers.

Database Technology and Information Technology

What is Information Technology?

The modern world runs on information technology (IT). IT professionals use software tools to design, create, and maintain the information systems used to run organizations.

Academic Programs

This Folsom Lake College program includes study in database technology and information technology systems. It is designed for the student interested in entry-level information technology oriented employment in government, business, and industry. The database technology option offers certificates in a "ladder" approach, with introductory certificates providing progress towards more advanced certificates.

Career Options

- Administrator
- Computer Programmer – SQL
- Data Entry Specialist
- Database Analyst – SQL
- Internet Programmer
- Programmer Relational Database
- Systems Analyst
- Web Programmer

Highlights

- Technical training in designing and administering IT systems
- Hands-on experience in a state-of-the-art computer lab
- Study in a field that has great employment opportunities and encompasses many careers.

Program Maps

[Science, Technology, Engineering, and Mathematics Undecided Major \(/flc/main/doc/instruction/program-maps/STEM-Undecided-major.pdf\)](/flc/main/doc/instruction/program-maps/STEM-Undecided-major.pdf)

[Computer Science, A.S. Degree \(/flc/main/doc/instruction/program-maps/Computer-Science-AS.pdf\)](/flc/main/doc/instruction/program-maps/Computer-Science-AS.pdf)

[Computer Science, Information Technology, A.S. Degree \(/flc/main/doc/instruction/program-maps/Information-Technology-AS.pdf\)](/flc/main/doc/instruction/program-maps/Information-Technology-AS.pdf)

[Computer Science, Computer Programming, Certificate of Achievement \(/flc/main/doc/instruction/program-maps/Computer-Science-Certificate.pdf\)](/flc/main/doc/instruction/program-maps/Computer-Science-Certificate.pdf)

[Computer Science, Mobile Programming, Certificate of Achievement \(/flc/main/doc/instruction/program-maps/Mobile-Computing-Certificate.pdf\)](/flc/main/doc/instruction/program-maps/Mobile-Computing-Certificate.pdf)

Dean [Greg McCormac \(/about-us/contact-us/faculty-and-staff-directory/greg-mccormac\)](/about-us/contact-us/faculty-and-staff-directory/greg-mccormac)

Department Chair [Caleb Fowler \(/about-us/contact-us/faculty-and-staff-directory/caleb-fowler\)](/about-us/contact-us/faculty-and-staff-directory/caleb-fowler)

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Associate Degrees

A.S. in Computer Science

The Computer Science degree provides a comprehensive exposure to computer science in preparation for upper-division computer science courses. The program also prepares students for entry level employment in the computer and related industries.

Catalog Date: January 1, 2021

Degree Requirements

COURSE CODE	COURSE TITLE	UNITS
CISC 310	Introduction to Computer Information Science	3
CISP 300	Algorithm Design/Problem Solving	3
CISP 310	Assembly Language Programming for Microcomputers (4)	4
or ENGR 303	Introduction to Logic Design (4)	
CISP 360	Introduction to Structured Programming	4
CISP 400	Object Oriented Programming with C++ (4)	4
or CISP 401	Object Oriented Programming with Java (4)	
CISP 430	Data Structures	4
CISP 440	Discrete Structures for Computer Science	3
A minimum of 5 units from the following:		5
CISC 315	Introduction to Computer Game Design (3)	
CISP 351	Introduction to Relational Database Design and SQL (3)	
CISP 362	Programming for Mobile Devices I (4)	
CISP 363	Programming for Mobile Devices II (4)	
CISP 370	Beginning Visual Basic (4)	
CISP 400	Object Oriented Programming with C++ (4)	
CISP 401	Object Oriented Programming with Java (4)	
CISP 405	Object Oriented Programming using C# on Visual Studio .NET (4)	
CISW 400	Client-side Web Scripting (4)	
CHEM 400	General Chemistry I (5)	
ENGR 303	Introduction to Logic Design (4)	
ENGR 400	Introduction to Electrical Circuits and Devices (3)	
MATH 400	Calculus I (5)	
PHYS 411	Mechanics of Solids and Fluids (4)	
Total Units:		30

The Computer Science Associate in Science (A.S.) degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See FLC graduation requirements.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- design, write, test and debug computer programs, using a low-level language, a structured language, and an object-oriented language.
- evaluate various solutions to a proposed problem in terms of programming languages, software architecture, and other appropriate computer technologies.
- demonstrate a fundamental knowledge of the basic concepts that define the discipline of computer science, such as data structures, discrete mathematics, basic computer architecture, operating system internals, networking fundamentals, and programming languages.

Career Information

Career opportunities include various technical and support jobs in the computer industry, such as software tester, software developer, programmer, analyst, etc... Additional opportunities include business-related jobs in the computer industry that require a fundamental knowledge of computer science.

A.S. in Information Technology

This degree allows students to acquire basic core Information Technology competencies that will prepare them for a career in Computer Networking, Cybersecurity, and related fields.

Catalog Date: January 1, 2021

Degree Requirements

COURSE CODE	COURSE TITLE	UNITS
CISC 310	Introduction to Computer Information Science	3
CISN 304	Networking Technologies (3)	3
CISP 300	Algorithm Design/Problem Solving	3
CISP 360	Introduction to Structured Programming	4
CISS 310	Network Security Fundamentals	3
A minimum of 6 units from the following:		6
BUS 310	Business Communications (3)	

COURSE CODE	COURSE TITLE	UNITS
CISC 326	Linux Systems (3)	
CISP 351	Introduction to Relational Database Design and SQL (3)	
COMM 341	Organizational Communication (3)	
A minimum of 4 units from the following:		4
MATH 341	Calculus for Business and Economics (4)	
MATH 343	Modern Business Mathematics (4)	
MATH 400	Calculus I (5)	
STAT 300	Introduction to Probability and Statistics (4)	
Total Units:		26

The Information Technology Associate in Science (A.S.) degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See FLC graduation requirements.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- apply fundamental knowledge of computing and the current use of technology techniques, skills, and tools necessary for the computing practice.
- evaluate and solve business problems with technology solutions using qualitative and quantitative information.
- assess user needs in the selection, creation, evaluation and administration of computer-based information systems.

Career Information

The Associate's degree in Information Technology prepares students to either enter the workforce as an entry-level computer or network support technician or pursue a bachelor's degree in managing information systems. Several CSUs currently offer baccalaureate IT programs, as do several private universities. More CSUs are working to build upper division programs similar to the recently approved IT Model Curriculum.

Certificates of Achievement

Computer Programming Certificate

The Computer Programming Certificate provides students with the basic proficiencies required of entry level software technicians and computer programmers, or for further study in computer science.

Catalog Date: January 1, 2021

Certificate Requirements

COURSE CODE	COURSE TITLE	UNITS
CISC 310	Introduction to Computer Information Science	3
CISP 300	Algorithm Design/Problem Solving	3
CISP 360	Introduction to Structured Programming (4)	4
or CISP 370	Beginning Visual Basic (4)	
CISP 400	Object Oriented Programming with C++ (4)	4
or CISP 401	Object Oriented Programming with Java (4)	
or CISP 405	Object Oriented Programming using C# on Visual Studio .NET (4)	
CISP 430	Data Structures	4
CISP 440	Discrete Structures for Computer Science	3
Total Units:		21

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- design, write, test and debug computer programs, using a structured language, and an object-oriented language.
- evaluate software systems for conformance to system requirements.
- participate as a member of a software development team.

Career Information

Career opportunities include various technical and support jobs in the computer industry, such as software tester, software developer, programmer, analyst, etc.

Mobile Programming Certificate

This certificate offers a program of study for students seeking jobs in the fields of mobile application development. It provides opportunities to develop the necessary skills and aptitudes for designing, developing and testing a variety of application programs for mobile devices.

Catalog Date: January 1, 2021

Certificate Requirements

COURSE CODE	COURSE TITLE	UNITS
CISP 300	Algorithm Design/Problem Solving	3
CISP 360	Introduction to Structured Programming (4)	4
or CISP 401	Object Oriented Programming with Java (4)	
CISP 362	Programming for Mobile Devices I	4
CISP 363	Programming for Mobile Devices II	4
Total Units:		15

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- analyze how a mobile application program is developed using tools included in a software development kit.
- design software using object-oriented methods to develop event driven programs for mobile application programs.
- publish mobile applications in an application marketplace.

Career Information

Mobile devices such as tablets and smart phones continue to be more cost effective and versatile. Due to the portability, cost, built-in devices and user-friendliness, mobile devices gain much popularity in end-user and commercial markets. As a result, there is a great demand for developers and software engineers who can write application programs for mobile devices. A developer with this certificate can work as an independent mobile application developer or join a team of developers in software firms that specialize in mobile application development.

Computer Information Science - Applications (CISA) Courses

CISA 299 Experimental Offering in Computer Information Science - Applications

Units: 0.5 - 4
Prerequisite: None.
Catalog Date: January 1, 2021

CISA 320 Introduction to Database Management

Units: 1
Hours: 18 hours LEC; 18 hours LAB
Prerequisite: None.
Advisory: CISC 300 or 310
Transferable: CSU
C-ID: C-ID BSOT 113X
Catalog Date: January 1, 2021

This course introduces database management systems. Using the Microsoft Access application, students will design and implement practical database applications. Topics include such items as database and report design, data views and queries, and data maintenance.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- analyze data needs and determine the appropriate structure and solutions to enter, manipulate, store and display data.
- develop tables for data by defining their structure, data types and formats.
- design and test forms using graphical tools or controls to facilitate data input.
- define queries which result in data extraction from single tables to produce desired results.
- design and implement reports which display extracted data in an accurate, reliable and readable format.
- describe the importance of database maintenance regarding timeliness, reliability, accuracy, credibility, repair and backup.

CISA 321 Intermediate Database Management

Units: 1
Hours: 18 hours LEC; 18 hours LAB
Prerequisite: CISA 320 with a grade of "C" or better
Transferable: CSU
C-ID: C-ID BSOT 123X
Catalog Date: January 1, 2021

This course will extend the capabilities of students who have completed a first course in database management. Students will design and implement practical database applications, including relational database design to develop programming applications.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- analyze database tables to choose relationships between multiple tables.
- design switchboard forms and tables for ease of use by nontechnical users.
- convert data from various applications into a database structure through export and import features.
- design and implement multiple table data management systems involving custom data entry screens, reports, and labels.
- formulate complex queries, and develop forms/subforms and reports based on those queries.
- use Visual Basic for Applications (VBA) to construct macros and modules for database automation.

CISA 499 Experimental Offering in Computer Information Science - Applications

Units:	0.5 - 4
Prerequisite:	None.
Transferable:	CSU
Catalog Date:	January 1, 2021

Computer Information Science - Core (CISC) Courses

CISC 300 Computer Familiarization

Units:	1
Hours:	18 hours LEC; 18 hours LAB
Prerequisite:	None.
Transferable:	CSU
General Education:	AA/AS Area III(b)
C-ID:	C-ID BSOT 105X
Catalog Date:	January 1, 2021

This is an introductory course to provide general knowledge on topics such as how computers work, computer terminology, and the impact of computers on society and the work environment. Beginning level hands-on instruction using an operating system, word processing software, spreadsheet software, and the Internet will be emphasized. Students will be reading and interpreting written and oral instructions of a technical nature. Students with limited computer knowledge should take this course in-class, not on-line. Students should have access to a computer with internet and an active Los Rios e-mail account. They should have computer media to store data files such as a USB drive.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- identify the components of computer hardware by describing and stating the purpose and capabilities of the various hardware devices such as system case, power supply, disk drives, monitor, motherboard, printer, mouse, keyboard, and various ports.
- describe the differences between operating system, application, and utility software in respect to what each program does in relationship to a computer system.
- describe and show the use basic Windows operating system commands to prepare storage media, view, copy, move and erase files and folders.
- create, save, and print simple word processing documents using basic editing and formatting techniques.
- design, create, preview, save, and print simple spreadsheets using basic data entry, editing, and formatting techniques.

CISC 310 Introduction to Computer Information Science

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Transferable:	CSU; UC
General Education:	AA/AS Area II(b); AA/AS Area III(b)
C-ID:	C-ID BUS 140
Catalog Date:	January 1, 2021

This course is an examination of information systems and their role in business. The focus is on information systems, database management systems, networking, e-commerce, ethics and security, computer systems hardware and software components. Students will develop experience applying these concepts and methods through hands-on projects creating computer-based solutions to business problems.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- SLO1: DESCRIBE EXISTING AND EMERGING TECHNOLOGIES AND THEIR IMPACT ON ORGANIZATIONS AND SOCIETY.
- explain how a computer system works.
- distinguish the various hardware and software components of a computer system.
- differentiate between the most commonly used computer operating systems.
- differentiate between system software and application software.

- assess the differences between each of the categories of system and application software.
- evaluate the social issues pertaining to computer technology including ethics, copyright, privacy and security.
- SLO2: ARTICULATE THE DEVELOPMENT AND USE OF INFORMATION SYSTEMS IN BUSINESS.
- differentiate between various computer network types and scopes.
- propose methods for securing business information systems and the secure utilization of Internet resources.
- discuss and relate the phases of the System Development Life Cycle.
- recommend methods for accessing business information systems.
- SLO3: SOLVE COMMON BUSINESS PROBLEMS USING APPROPRIATE INFORMATION TECHNOLOGY APPLICATIONS AND SYSTEMS.
- construct solutions to common business problems using electronic spreadsheets in Microsoft Excel.
- manipulate databases using database software in Microsoft Access.
- build software solutions to business problems using internet technologies.

CISC 315 Introduction to Computer Game Design

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Transferable:	CSU; UC
Catalog Date:	January 1, 2021

This course introduces students to the fundamentals of game design with an emphasis in applying those fundamentals to the creation of computer games. Students will explore the various genres of computer games, including hardware and mobile games. No programming skills are required. Students will explore the relationship between player experience and game mechanics.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- articulate the strengths and weaknesses of various published games.
- articulate the critical game mechanics utilized in various computer and non computer games.
- hypothesize how specific game mechanics may potentially influence the designed player experience of a specific game.
- utilize feedback from focus groups to refine the student's game design.

CISC 326 Linux Systems

Units:	3
Hours:	36 hours LEC; 54 hours LAB
Prerequisite:	None.
Transferable:	CSU
Catalog Date:	January 1, 2021

This course introduces the Linux operating system for microcomputers. Concepts include kernels, file structures, daemons, and shells. The course will also include procedures for installing software, creation of user accounts, shell commands, scripts, file security, Perl and C scripting, Common Gateway Interface, system installs, administration, security, and graphical user shells such as X-Windows. Not open to students who have completed CISC 325.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- demonstrate the use of basic Linux commands, text editors, and simple system tools.
- create simple to intermediate scripts to automate tasks, and compile simple C programs in the Linux environment.
- demonstrate an understanding of basic operating system internals, such as kernels, disk and memory management, threads, and processes.
- install, configure, and administer an operating system and common systems software such as a web server or a relational database system.
- determine network requirements and perform network administration tasks such as configuration of network interfaces and firewalls, create users and groups, and configure security settings.

CISC 495 Independent Studies in Computer Information Science - Core

Units:	1 - 3
Hours:	54 - 162 hours LAB
Prerequisite:	None.
Transferable:	CSU
Catalog Date:	January 1, 2021

CISC 498 Work Experience in Computer Information Science - Core

Units:	1 - 4
Hours:	60 - 300 hours LAB
Prerequisite:	None.

Enrollment Limitation:	Student must be in a paid or non-paid internship, volunteer opportunity, or job related to career interests.
Advisory:	ENGWR 101 or ESLW 320
Transferable:	CSU
General Education:	AA/AS Area III(b)
Catalog Date:	January 1, 2021

This course provides students with opportunities to develop marketable skills in preparation for employment or advancement within the field of Computer Information Science. Course content will include understanding the application of education to the workforce; completing required forms which document the student's progress and hours spent at the work site; and developing workplace skills and competencies. During the semester, the student is required to attend orientation. Students must complete 75 hours of related paid work experience, or 60 hours of related unpaid work experience, for one unit. An additional 75 hours of related paid work experience or 60 hours of related unpaid work experience is required for each additional unit. The course may be taken for a maximum of 16 units. Students should have access to a computer, the Internet, and some computer media such as a USB drive to store data files. Online students must have an email account. Only one Work Experience course may be taken per semester.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- apply industry knowledge and theoretical concepts in a field of study or career as written in the minimum 3 learning objectives created by the student and his/her employer or work site supervisor at the start of the course.
- manage personal career plans and decision making using industry & workforce information and online resources.
- behave professionally and ethically, exhibit adaptability, initiative, self-awareness and self-management as needed.
- exhibit effective communication, collaboration, and leadership skills at work with consideration to workplace dynamics and social and diversity awareness.
- demonstrate critical and creative thinking skills as they apply to the workplace.

CISC 499 Experimental Offering in Computer Information Science - Core

Units:	0.5 - 4
Prerequisite:	None.
Catalog Date:	January 1, 2021

This is a course designed to give students an opportunity to study topics in Computer Information Science which are not included in the current course offerings. This course may be repeated for credit providing there is no duplication of topics.

Computer Information Science - Networking (CISN) Courses

CISN 304 Networking Technologies

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Advisory:	CISC 310 with a grade of "C" or better
Transferable:	CSU
C-ID:	C-ID ITIS 150
Catalog Date:	January 1, 2021

This course provides a comprehensive survey of local and wide area networks, technologies, protocols, and connectivity. Topics covered include network topologies, the Open Systems Interconnection seven-layer model for communication, communication protocols and standards, access methods, and data translation and transmission equipment and media. This course is intended to prepare students for programming and system administration activities as well as the CompTIA Network+ certification exam.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- describe and differentiate the devices and services used to support communications in data networks and the Internet.
- describe the role of protocol layers in data networks.
- evaluate the importance of addressing and naming schemes at various layers of data networks in IPv4 and IPv6 environments.
- design, calculate, and apply subnet masks and addresses to fulfill given requirements in IPv4 and IPv6 networks.
- configure a simple Ethernet network using routers and switches.
- experiment with common network utilities to verify small network operations and analyze data traffic.

Computer Information Science - Programming (CISP) Courses

CISP 300 Algorithm Design/Problem Solving

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Advisory:	CISC 310

Transferable:	CSU; UC
General Education:	AA/AS Area II(b)
Catalog Date:	January 1, 2021

This course introduces the Computer Science major to methods for solving classical computer problems through algorithm design. Topics include introduction to structured design, control structures, arrays, object oriented programming, and file processing. Students will learn how to assess and analyze computer problems in a top-down, divide-and-conquer approach that leads to a programming solution. It also includes creating programming plans and detailed design documents from which source code versions of programs will be created.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- choose and apply control structures to solve complex problems.
- verify empirically the correctness of an algorithm by means of tracing values of variables to validate the accuracy of the solution.
- develop and create professional, structured programming detailed design documents from which source code can be created.
- convert values between the binary, decimal, and hexadecimal number systems in order to understand how data are represented in a computer and interpret ASCII values.
- differentiate roles involved in software development, including developers, analysts, and test engineers.

CISP 310 Assembly Language Programming for Microcomputers

Units:	4
Hours:	72 hours LEC
Prerequisite:	CISP 360 with a grade of "C" or better
Transferable:	CSU; UC
C-ID:	C-ID COMP 142
Catalog Date:	January 1, 2021

This course is an introduction to computer architecture using assembly language programs. Topics include binary representation of data and instructions, memory addressing modes, subroutines and macros, operating system interrupts, processor architecture, and interfacing with high level languages.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- recognize the computer architecture issues needed to write assembly language code.
- compare and contrast the binary representation of data and assembly language instructions.
- create assembly language programs that accept input, perform calculations, and make decisions based on the input, and display an answer.
- explain the roles of software in the creation, building, and debugging of executable files using assembly language.
- formulate and implement algorithms to solve complex problems using assembly language.

CISP 351 Introduction to Relational Database Design and SQL

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Transferable:	CSU
Catalog Date:	January 1, 2021

This course is designed to introduce relational database technology, normalization, entity relationships, logical model design, and ISO-ANSI standard Structured Query Language (SQL). Topics covered include: database design, basic properties of a relational database such as relations, tables, primary keys, foreign keys and principles of normalization, simple SQL select statements, sorting and grouping data, joining tables, subqueries and views. The database design section focuses on logical model design and entity-relationship (E-R) modeling. Students will leave the course with a good working knowledge of database technology.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- demonstrate an understanding of basic Relational Database Management System terminology.
- develop a database model to the third normal form.
- create an entity-relationship (E-R) diagram.
- create database objects using Data Definition Language.
- construct SQL statements that will add, delete, and change data using Data Manipulation Language.
- construct queries, subqueries, and joins using Data Query Language.
- demonstrate an understanding of transaction control statements in SQL.

CISP 352 Intermediate SQL

Units:	3
Hours:	54 hours LEC

Prerequisite:	None.
Advisory:	CISP 351
Transferable:	CSU
Catalog Date:	January 1, 2021

This course builds upon the Introduction to Relational Databases and Structured Query Language (SQL) course with more in-depth SQL constructs common to most commercial database products and extensions to the SQL language. Topics include: complex joins including inner and outer joins, correlated subqueries, complex table definition, table and column constraints, union, intersection, minus, triggers, procedures and functions.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- design, implement, and demonstrate an understanding of SQL constructs to include data definition language, data manipulation language, and data query language.
- design, create, and implement procedures, functions, and triggers and passing parameters to and from procedures and functions.
- design, create, and implement cursor processing, iterative control structures, and the IF-THEN-ELSE control structure.
- design and implement error handling routines in procedures, functions, and triggers.

CISP 360 Introduction to Structured Programming

Units:	4
Hours:	72 hours LEC
Prerequisite:	CISP 300 with a grade of "C" or better
Transferable:	CSU; UC
General Education:	AA/AS Area II(b)
C-ID:	C-ID COMP 112; C-ID COMP 122
Catalog Date:	January 1, 2021

This course is an introduction to structured programming. The topics covered include: top-down design, input/output considerations, control structures and flow control, variables, constants, the use of libraries, simple to intermediate data structures, functions, and arguments. An introduction into objects will be included.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- organize C/C++ code into modules.
- create C/C++ programs demonstrating file operations, pointers, and/or structures.
- create programming problem solutions in C/C++ using selection statements.
- create programming problem solutions in C/C++ using iteration.
- create programming problem solutions in C/C++ demonstrating the appropriate use of single and multidimensional array data structures.
- create programming problem solutions in C/C++ demonstrating the appropriate use of dynamic memory.

CISP 362 Programming for Mobile Devices I

Units:	4
Hours:	54 hours LEC; 54 hours LAB
Prerequisite:	None.
Advisory:	CISC 310 and CISP 300 with grades of "C" or better
Transferable:	CSU
Catalog Date:	January 1, 2021

This course is an introduction to programming for mobile devices such as cell phones and tablets. Topics include development tools, user interface design, documentation, testing, debugging, and publishing.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- install the necessary tools for mobile device software development.
- develop basic programs with a graphical user interface.
- test and debug programs with a graphical user interface.
- publish mobile device programs.

CISP 363 Programming for Mobile Devices II

Units:	4
Hours:	54 hours LEC; 54 hours LAB
Prerequisite:	CISP 360 or 362 with a grade of "C" or better
Advisory:	CISP 401
Transferable:	CSU
Catalog Date:	January 1, 2021

This course introduces intermediate level topics related to programming for mobile devices such as cell phones and tablets. Topics include the syntax of Java, object-oriented programming, and mobile-specific techniques and considerations. Students have an option of purchasing the software or using the software on campus.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- develop procedural logic for mobile applications.
- synthesize object-oriented class structure to organize components of mobile applications.
- evaluate correctness and efficiency of mobile applications.
- formulate object-oriented solutions to mobile programming problems.
- identify various types of processes on a mobile platform.
- design mobile applications that utilize the user interface.

CISP 370 Beginning Visual Basic

Units:	4
Hours:	72 hours LEC
Prerequisite:	CISP 300 with a grade of "C" or better
Transferable:	CSU; UC
Catalog Date:	January 1, 2021

This course is an introduction to the Visual Basic programming language. Students will design Console and Graphical User Interface programs for the Windows environment. Topics include control structures such as simple sequence, decisions, iteration, procedures events, properties, error handling, form handling, and the use of typical controls such as buttons, textboxes, checkboxes, and listboxes. This course will provide students with a foundation in the use of objects, object libraries, and object-oriented-event-driven programming techniques.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- design and implement a Graphical User Interface (GUI) to act as the interface between Visual Basic code and an end user.
- create source code, debug programs, and execute applications using the Visual Studio .NET Integrated Development Environment (IDE).
- write programs that utilize data from text files, databases, and other sources
- demonstrate the use of the classes in simple .NET Framework namespaces such as System.Windows.Forms.

CISP 400 Object Oriented Programming with C++

Units:	4
Hours:	54 hours LEC; 54 hours LAB
Prerequisite:	CISP 360 with a grade of "C" or better
Transferable:	CSU; UC
General Education:	AA/AS Area II(b)
C-ID:	C-ID COMP 122
Catalog Date:	January 1, 2021

This course is an introduction to object-oriented programming using the C++ programming language. This course is designed to enhance students' abilities to implement object-oriented programs and to further develop programming proficiency. Detailed topics include classes, storage class and scope, encapsulation, polymorphism, inheritance, function overloading and overriding, virtual functions, operator overloading, templates, exception handling, stream I/O, file processing, and the Standard Template Library. Also covered are introductions to Graphical User Interface (GUI) development using class libraries, and object oriented design methodology.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- develop skills in object-oriented programming techniques using C++.
- use the programming language through coding, running, and testing programs.
- demonstrate an understanding of programming vocabulary and concepts.
- apply appropriate coding format and documentation standards to written programs.

CISP 401 Object Oriented Programming with Java

Units:	4
Hours:	54 hours LEC; 54 hours LAB
Prerequisite:	CISP 360 with a grade of "C" or better
Transferable:	CSU; UC
Catalog Date:	January 1, 2021

This course is an introduction to Object Oriented Programming using the Java language. Topics include: objects, classes, UML, function overloading, inheritance, static and dynamic class relationships, polymorphism, components, graphical user interfaces, event driven programming, class associations, interfaces, error handling, threads, file I/O, testing and debugging. This provides the student with a well rounded background in Java and is good preparation for advanced topics.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- design and implement object-oriented software applications using Unified Modeling Language (UML) and the Java language.
- design and implement reusable software components using inheritance, containment, or polymorphism (abstract classes, interfaces).
- design and implement event driven Graphical User Interface (GUI) applications, and console applications using Java.
- utilize successfully Java resources such as files, threads, sockets, string processing, and simple database access.

CISP 405 Object Oriented Programming using C# on Visual Studio .NET

Units:	4
Hours:	72 hours LEC
Prerequisite:	CISP 360, 370, or 401 with a grade of "C" or better
Transferable:	CSU; UC
Catalog Date:	January 1, 2021

This course is an introduction to the C# programming language using Visual Studio.NET. Topics include the Visual Studio.NET Integrated Development Environment (IDE), object oriented programming concepts, and various .NET technologies. Students will develop programs for the Windows desktop and Web browsers (ASP.NET), as well as explore other .NET technologies such as Web Services, Windows Services, and .NET Remoting.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- demonstrate proficiency in using the Visual Studio .NET integrated development environment to develop Windows desktop Graphical User Interface (GUI) and Web browser applications.
- define and show how to use typical Visual Basic programming concepts such as control structures, properties, methods, events, threads, arrays, abstract data types, object libraries, and simple database access.
- utilize structured exception handling mechanisms, create custom exception types, handle exceptions, and raise exceptions in property procedures.
- implement a simple N-Tier architecture using compiled binary components and several of the following .NET technologies: Web Services, Windows Services, and .NET Remoting.

CISP 407 Programming in Python

Units:	4
Hours:	54 hours LEC; 54 hours LAB
Prerequisite:	CISP 360 with a grade of "C" or better
Transferable:	CSU; UC
Catalog Date:	January 1, 2021

This course provides an introduction to programming with Python. It is designed to enhance students' abilities to implement programs in Python. Topics include input/output considerations, decision structures and flow control, functions, file processing, and data structures. An introduction to objects will be included.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- understand the Python language and how to apply Python syntax, documentation, and modules.
- utilize modular design and libraries in the development of algorithms to create solutions to computing problems.
- utilize and understand the use of assignment statements, conditional statements, loops, function calls and sequences. Be able to design, code, and test small and complex Python programs.
- solve classical programming problems that includes searching and sorting using Python.
- describe the concepts of object-oriented programming as used in Python.

CISP 430 Data Structures

Units:	4
Hours:	54 hours LEC; 54 hours LAB
Prerequisite:	CISP 400 with a grade of "C" or better
Transferable:	CSU; UC
Catalog Date:	January 1, 2021

This is a course in data structures for computer science. Topics include time complexity analysis and big-O notation, recursion, searching and sorting, linked lists, stacks, queues, priority queues, binary trees, B-trees, graphs, hashing, and basic encryption algorithms.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- analyze algorithm efficiency using Big-O Notation.
- implement recursive algorithms.

- use pointers to implement linked structures.
- perform hand execution of algorithms.

CISP 440 Discrete Structures for Computer Science

Units:	3
Hours:	54 hours LEC
Prerequisite:	CISP 360 and MATH 370 with grades of "C" or better, or placement through the assessment process.
Transferable:	CSU; UC
General Education:	AA/AS Area II(b)
Catalog Date:	January 1, 2021

This course is an introduction to the essential discrete structures used in Computer Science, with emphasis on their applications. Topics to be covered include: binary number representation and arithmetic, sets, relations, functions, formal propositional logic and proofs, digital logic and combinational circuits, finite state machines, regular expressions and formal grammars. Students will implement programs to illustrate principles of discrete structures.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- compare and analyze the fundamental aspects of computer arithmetic including real and negative number binary representation and arithmetic algorithms at the binary level.
- describe the fundamentals of discrete sets, relations, sequences, strings, and functions.
- analyze various methods of tree and graph traversals; examine graph and tree algorithms and their application to solving practical problems.
- analyze and assess fundamental digital logic circuits utilizing Boolean algebra, logic gates, combinational circuits and circuit minimization.
- explain the basic notions of logical proofs, conditional propositions, logical equivalence, quantifiers, and mathematical induction.
- understand the concepts of Linear Recurrences, Fibonacci numbers, Dependent (Bayes) probability, Independent (binomial) probability, Pascal's Triangle, the Binomial theorem, Pascal's Identity, and the Master Theorem.
- design finite state machines, regular expressions, and formal grammars.

CISP 454 Introduction to Software Testing

Units:	3
Hours:	36 hours LEC; 54 hours LAB
Prerequisite:	CISP 400 or 401 with a grade of "C" or better; or object oriented programming industry experience.
Transferable:	CSU; UC
Catalog Date:	January 1, 2021

Students will learn and apply industry standard processes and methods for analyzing and testing software, reporting defects effectively, and developing and executing test plans for software projects. Students will be exposed to software tools that implement various testing approaches, including test driven development (TDD). Student teams apply what they learn throughout the course on small development projects. This course prepares students for practical work in the software industry by exposing them to the latest approaches and tools. Examples will be presented in Java and C++.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- explain quality assurance and its relationship to verification and validation.
- compare unit, integration and system testing.
- use Test Driven Development (TDD) to write a piece of software.
- design and review test cases and analyze the results.

CISP 499 Experimental Offering in Computer Information Science - Programming

Units:	0.5 - 4
Prerequisite:	None.
Transferable:	CSU
Catalog Date:	January 1, 2021

Computer Information Science - Security (CISS) Courses

CISS 310 Network Security Fundamentals

Units:	3
Hours:	45 hours LEC; 27 hours LAB
Prerequisite:	CISN 304 with a grade of "C" or better
Transferable:	CSU
Catalog Date:	January 1, 2021

This course provides fundamental knowledge for system risk analysis and a workable security policy implementation that protects information assets from potential intrusion, damage, or theft. The required

content of the Computing Technology Industry Association (CompTIA) Security+ certification exam is covered.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- describe the fundamental principles of information systems security.
- define the concepts of threat, evaluation of assets, information assets, physical, operational, and information security and how they are related.
- evaluate the need for the careful design of a secure organizational information infrastructure.
- perform risk analysis and risk management.
- determine both technical and administrative mitigation approaches.
- explain the need for a comprehensive security model and its implications for the security manager or Chief Security Officer (CSO).
- create and maintain a comprehensive security model.
- apply security technologies.
- define basic cryptography, its implementation considerations, and key management.
- design and guide the development of an organization's security policy.
- determine appropriate strategies to assure confidentiality, integrity, and availability of information.
- apply risk management techniques to manage risk, reduce vulnerabilities, threats, and apply appropriate safeguards/controls.

Computer Information Science - Web (CISW) Courses

CISW 300 Web Publishing

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Transferable:	CSU
Catalog Date:	January 1, 2021

This course is an introduction to publishing on the Internet's World Wide Web (WWW), organizing a series of pages into a web site, and uploading web pages to a server. The course makes extensive use of the techniques necessary to create (HyperText Markup Language) HTML tags, create images, and view web documents. This course prepares apprentice web designers and publishers to identify information and dissemination needs of a client, design and appropriate WWW solution and implement it.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- identify information dissemination situations that are suitable for online publishing on the Internet's World Wide Web (WWW).
- apply structured design principles to the creation of WWW documents using Hypertext Markup Language (HTML) and understand how the structure and format of HTML, known as (eXtensible HyperText Markup Language) XHTML and (Extensible Markup Language) XML, is enforced by the WWW Consortium (W3C).
- demonstrate competence and facility with the software, hardware, and networking tools necessary for publishing documents on the WWW.
- identify the information dissemination needs of a client, design an appropriate WWW solution, implement it, present the solution to the client, and revise as necessary.
- evaluate existing WWW sites for style, structure, and usability.
- develop strategies for expanding, maintaining and improving WWW sites once they have been created.

CISW 320 Introduction to Web Development

Units:	3
Hours:	54 hours LEC
Prerequisite:	CISC 310 with a grade of "C" or better
Transferable:	CSU
Catalog Date:	January 1, 2021

This course introduces fundamental aspects of coding HTML and CSS. Technical aspects of Web development will be included for using text, images, links, objects, and multimedia on Web pages. Open source developer tools and online resources will be introduced. Websites will be managed locally and on a network using effective file management and file transfer protocols. World Wide Web Consortium (W3C) recommended standards will be emphasized using a structured approach in writing validated, adaptive code for multiple devices: cell, tablet, desktop. Students must have access to high-speed internet, necessary hardware, software, and other digital resources.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- write HTML code using the correct syntax and correct structure for a Web page.
- write CSS code using the correct syntax to control page layout and visual detail for Web pages; use inline, embedded and external styles.
- analyze existing Websites for style, structure, and usability in multiple browsers and multiple devices including: cell phones, tablets and desktops.
- develop websites composed of multiple pages demonstrating effective information architecture and site navigation.
- validate code to meet recommended standards of the World Wide Web Consortium (W3C) for multiple browsers and devices.

- research and organize online resources to remain current in Web development.
- examine open source text editors for Web developers.

CISW 400 Client-side Web Scripting

Units:	4
Hours:	72 hours LEC
Prerequisite:	CISW 300 with a grade of "C" or better
Advisory:	CISC 310 and CISP 300
Transferable:	CSU
Catalog Date:	January 1, 2021

This course emphasizes the creation of dynamic and interactive Web sites using a client-side scripting language such as JavaScript. Topics include the Document Object Model (DOM) that defines structured Web pages, core features of the client-side scripting language, event handling, control of windows and frames, functions, and form validation.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- identify dynamic and interactive Web publishing situations appropriate for client-side scripting.
- manipulate the various components of a Web page as objects in the Document Object Model.
- analyze Web publishing problems and situations and develop solutions using the client-side scripting language.
- build functions and utilize event handlers in the client-side scripting language.
- assemble the core structures, statements, and syntax of the client-side scripting language in order to create dynamic and interactive Web applications.

CISW 499 Experimental Offering in Computer Information Science - Web

Units:	0.5 - 4
Prerequisite:	None.
Transferable:	CSU
Catalog Date:	January 1, 2021

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