Computer Science

(See also Engineering)

CIS 118 INTRODUCTION TO COMPUTER SCIENCE
Introduction to computer hardware and the programming commands to control them. Topics Include: hardware, operating systems and the Software Development Life Cycle which includes design, development, documentation, the importance of review, principles of testing and maintenance; Algorithm development, Procedural and Structure programming with C/C++; data types, variables, expressions, selection and repetition structures, functions passing by value and reference, recursion, all about arrays, file I/O, error handling, and classes. This course gives students basic computer science concepts and skills. Grade Option (Letter Grade or Pass/No Pass). Degree Credit.

Units: 4
Hours/semester: 48-54 Lecture; 96-108 Homework
Recommended: Eligibility for ENGL 100.
Transfer Credit: CSU, UC
C-ID: COMP 112

CIS 122 INTRODUCTION TO PROGRAMMING: PYTHON
Designed to teach computer programming to non-Computer Science majors with an introduction to Python Programming in interesting, relevant, and practical contexts. Focus is on hands-on Python programming skills, problem-solving using algorithmic thinking, abstraction, implementing an algorithm to executable code, debugging and testing software programs. Fundamental programming constructs such as variables, data types, selection, iteration, functions, data structures (lists, strings, dictionaries, tuples), file I/O, and other core concepts are covered. Applications focus on computational techniques to understand, analyze, and automate data analysis, basic encryption algorithms, matrix manipulation, sorting and searching algorithms, basic game design, and more. Grade Option (Letter Grade or Pass/No Pass). Degree Credit.

Units: 3
Hours/semester: 48-54 Lecture; 96-108 Homework
Recommended: Eligibility for MATH 110. Eligibility for ENGL 100.
Transfer Credit: CSU, UC
C-ID: COMP 122

CIS 242 COMPUTER ARCHITECTURE AND ASSEMBLY LANGUAGE
Covers the basics of Integrated Circuit technology, digital logic gates and circuit design, computer organization and ISA standard computer architecture, microcode, number systems and data representation, machine languages, Assembly languages and programming, Operating Systems, high-level languages and programming, and the Application Abstraction Levels. Letter Grade Only. Degree Credit.

Units: 3
Hours/semester: 48-54 Lecture; 96-108 Homework
Recommended: Eligibility for ENGL 100. CIS 118
Transfer Credit: CSU, UC
C-ID: COMP 142

CIS 250 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING: C++
Introduction to programming and software engineering for computer science majors and computer professionals. A systematic approach to the design, implementation, and management of robust C++ computer programs. Course emphasizes topics such as Object Oriented programming design, templates, big O, trees, programming documentation, testing and debugging techniques. This course conforms to the ACM CS1 standards. Letter Grade Only. Degree Credit.

Units: 3
Hours/semester: 48-54 Lecture; 96-108 Homework
Recommended: Eligibility for ENGL 100. CIS 118 and MATH 120 or MATH 123 (offered at CSM or Skyline)
Transfer Credit: CSU, UC
C-ID: COMP 122

CIS 252 INTRODUCTION TO DATA STRUCTURES - C++
Design and implementation of larger projects using object-oriented software engineering principles with emphasis on definition and use of data structures including: arrays, stacks, queues, linked lists, trees, hash tables, dictionaries, sets and graphs. Standard methods are used for sorting, searching and analyzing the relative efficiency of algorithms (Big-O notation). This course conforms to the ACM CS2 standards. Letter Grade Only. Degree Credit.

Units: 3
Hours/semester: 48-54 Lecture; 96-108 Homework
Recommended: Eligibility for ENGL 100. CIS 250
Transfer Credit: CSU, UC
C-ID: COMP 132
CIS 262 DISCRETE MATHEMATICS FOR COMPUTER SCIENCE
Covers topics in discrete mathematics with emphasis on computer science applications. Includes algorithms, Master's theorem, base and number representation, logic, sets and category theory, relations, functions, induction, recursion, Boolean algebra and digital circuits, combinatorics, Pascal's Identity, permutations and combinations, counting, probability, Bayes' Theorem, Statistics, algebraic structures, Binomial theorem, directed and undirected graphs, elementary number theory, discrete probability, proof techniques, induction, pigeonhole principle, sequences, Fibonacci numbers and computational complexity. **Letter Grade Only. Degree Credit.**

**Units:** 3

**Hours/semester:** 48-54 Lecture; 96-108 Homework

**Prerequisites:** CIS 250 or CIS 284 and MATH 120 or MATH 123 (offered at CSM or Skyline) with a grade of C or better, or appropriate score on the College Placement Test or other multiple measures assessment.

**AA/AS Degree Requirements:** Math Competency

**Transfer Credit:** CSU, UC

**C-ID:** COMP 152

CIS 284 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING- JAVA
Introduction to programming and software engineering for computer science majors and computer professionals. A systematic approach to the design, implementation, and management of robust Java computer programs. Course emphasizes object oriented programming design, programming documentation, testing and debugging techniques. This course conforms to the ACM CS1 standards. **Grade Option (Letter Grade or Pass/No Pass). Degree Credit.**

**Units:** 3

**Hours/semester:** 48-54 Lecture; 96-108 Homework

**Recommended:** Eligibility for ENGL 100. CIS 118

**Transfer Credit:** CSU, UC

**C-ID:** COMP 122

CIS 286 INTRODUCTION TO DATA STRUCTURES - JAVA
Design and implementation of larger projects using object-oriented software engineering principles with emphasis on definition and use of data structures including arrays, stacks, queues, linked lists, n-trees, binary trees, hash tables, dictionaries, sets and graphs using JAVA. Standard methods are used for sorting, searching, analyzing the relative efficiency of algorithms (Big-O notation) and recursion. This course conforms to the ACM CS2 standards. **Grade Option (Letter Grade or Pass/No Pass). Degree Credit.**

**Units:** 3

**Hours/semester:** 48-54 Lecture; 96-108 Homework

**Prerequisites:** CIS 284 or equivalent experience programming in JAVA.

**Recommended:** Eligibility for ENGL 100.

**Transfer Credit:** CSU, UC

**C-ID:** COMP 132

CIS 294 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING: SWIFT
Introduction to programming and software engineering for computer science majors and computer professionals. A systematic approach to the design, implementation, and management of robust Swift computer programs. Course emphasizes Object Oriented programming design, programming documentation, testing and debugging techniques. This course conforms to the ACM CS1 standards. **Grade Option (Letter Grade or Pass/No Pass). Degree Credit.**

**Units:** 3

**Hours/semester:** 48-54 Lecture; 96-108 Homework

**Recommended:** Eligibility for ENGL 100. CIS 118

**Transfer Credit:** CSU, UC

CIS 295 INTRODUCTION TO CLOUD COMPUTING
An introduction to cloud computing, which shifts information systems from on-premises computing infrastructure to highly scalable internet architectures. Provides a solid foundation of cloud computing technologies, and the understanding required to effectively evaluate and assess the business and technical benefits of cloud computing and cloud applications. Includes an analysis of a variety of cloud services (storage, servers and software applications) and cloud providers. Examines various industry cloud practices and applications. Also surveys cloud careers and discusses industry demand for cloud skills. **Grade Option (Letter Grade or Pass/No Pass). Degree Credit.**

**Units:** 3

**Hours/semester:** 48-54 Lecture; 96-108 Homework

**Recommended:** Eligibility for ENGL 100.

**Transfer Credit:** CSU

CIS 284 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING- JAVA
Introduction to programming and software engineering for computer science majors and computer professionals. A systematic approach to the design, implementation, and management of robust Java computer programs. Course emphasizes object oriented programming design, programming documentation, testing and debugging techniques. This course conforms to the ACM CS1 standards. **Grade Option (Letter Grade or Pass/No Pass). Degree Credit.**

**Units:** 3

**Hours/semester:** 48-54 Lecture; 96-108 Homework

**Recommended:** Eligibility for ENGL 100. CIS 118

**Transfer Credit:** CSU, UC

**C-ID:** COMP 122

CIS 286 INTRODUCTION TO DATA STRUCTURES - JAVA
Design and implementation of larger projects using object-oriented software engineering principles with emphasis on definition and use of data structures including arrays, stacks, queues, linked lists, n-trees, binary trees, hash tables, dictionaries, sets and graphs using JAVA. Standard methods are used for sorting, searching, analyzing the relative efficiency of algorithms (Big-O notation) and recursion. This course conforms to the ACM CS2 standards. **Grade Option (Letter Grade or Pass/No Pass). Degree Credit.**

**Units:** 3

**Hours/semester:** 48-54 Lecture; 96-108 Homework

**Prerequisites:** CIS 284 or equivalent experience programming in JAVA.

**Recommended:** Eligibility for ENGL 100.

**Transfer Credit:** CSU, UC

**C-ID:** COMP 132

CIS 294 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING: SWIFT
Introduction to programming and software engineering for computer science majors and computer professionals. A systematic approach to the design, implementation, and management of robust Swift computer programs. Course emphasizes Object Oriented programming design, programming documentation, testing and debugging techniques. This course conforms to the ACM CS1 standards. **Grade Option (Letter Grade or Pass/No Pass). Degree Credit.**

**Units:** 3

**Hours/semester:** 48-54 Lecture; 96-108 Homework

**Recommended:** Eligibility for ENGL 100. CIS 118

**Transfer Credit:** CSU, UC

**C-ID:** COMP 122

CIS 295 INTRODUCTION TO CLOUD COMPUTING
An introduction to cloud computing, which shifts information systems from on-premises computing infrastructure to highly scalable internet architectures. Provides a solid foundation of cloud computing technologies, and the understanding required to effectively evaluate and assess the business and technical benefits of cloud computing and cloud applications. Includes an analysis of a variety of cloud services (storage, servers and software applications) and cloud providers. Examines various industry cloud practices and applications. Also surveys cloud careers and discusses industry demand for cloud skills. **Grade Option (Letter Grade or Pass/No Pass). Degree Credit.**

**Units:** 3

**Hours/semester:** 48-54 Lecture; 96-108 Homework

**Recommended:** Eligibility for ENGL 100.

**Transfer Credit:** CSU
CIS 296 DATABASE ESSENTIALS IN THE CLOUD
Cloud database management, which supports a number of different approaches for storing data. Definitions, operations and scaling of both SQL (Structured Query Language) and noSQL data storage solutions. Considers factors that should be balanced during the design of a data storage solution. Principles are applied by performing exercises using both relational and non-relational database approaches. Grade Option (Letter Grade or Pass/No Pass). Degree Credit.
Units: 3
Hours/semester: 48-54 Lecture; 96-108 Homework
Recommended: Eligibility for ENGL 100.
Transfer Credit: CSU

CIS 297 CLOUD COMPUTE ENGINES
Explore how cloud computing systems are built using a common set of core technologies, algorithms, and design principles centered around distributed systems. Students will use various cloud platforms to provision, load-balance and scale their applications. The course discusses, from a developer perspective, the most important reasons for using cloud computing and examines the underlying design principles of scalable cloud applications. Grade Option (Letter Grade or Pass/No Pass). Degree Credit.
Units: 3
Hours/semester: 48-54 Lecture; 96-108 Homework
Prerequisites: CIS 284
Recommended: Eligibility for ENGL 100.
Transfer Credit: CSU

CIS 298 CLOUD SECURITY
Protection of the confidentiality, integrity and availability of computing systems and data. Uses of redundant and layered controls, continuous validation and testing, and automation to ensure that the cloud infrastructure is continuously monitored and protected. Examination of shared responsibility models. Grade Option (Letter Grade or Pass/No Pass). Degree Credit.
Units: 3
Hours/semester: 48-54 Lecture; 96-108 Homework
Prerequisites: CIS 295
Recommended: Eligibility for ENGL 100.
Transfer Credit: CSU

CIS 292 IPHONE PROGRAMMING: SWIFT
Introduction to programming the iPhone or iPad. Introduction to programming concepts, variables, assignments, selection, repetition, functions, object-oriented classes with their outlets and actions, Swift syntax, CocoaTouch environment, XCode IDE and the iPhone SDK to write original GUI programs for the iPhone, iPod Touch or iPad. Grade Option (Letter Grade or Pass/No Pass). Degree Credit.
Units: 3
Hours/semester: 48-54 Lecture; 96-108 Homework
Recommended: Eligibility for ENGL 100. CIS 118, and CIS 250 or CIS 284, or previous experience in object-oriented programming.
Transfer Credit: CSU, UC

CIS 680CF INTRODUCTION TO RELATIONAL DATABASES
Covers Relational database design and the use of database management systems. It covers Data Definition Language and Data Manipulation commands. It includes an introduction to the relational model, relational algebra, and SQL. The course includes relational design principles based on dependencies and normal forms. Covers normalization of data to eliminate data anomalies. Additional database topics introduced are indexes, views, transactions, authorization, integrity constraints, triggers, on-line analytical processing. Interactive and programmatic interfaces to database systems. All application programming projects use commercial database systems. Grade Option (Letter Grade or Pass/No Pass). Degree Credit.
Units: 3
Hours/semester: 48-54 Lecture; 96-108 Homework
Recommended: Eligibility for ENGL 100. CIS 118
Transfer Credit: CSU

CIS 695 INDEPENDENT STUDY
Designed for students who are interested in furthering their knowledge via self-paced, individualized instruction provided in selected areas or directed study to be arranged with instructor and approved by the division dean using the Independent Study Form. Varying modes of instruction can be used -- laboratory, research, skill development, etc. For each unit earned, students are required to devote three hours per week throughout the semester. Students may take only one Independent Study course within a given discipline. Grade Option (Letter Grade or Pass/No Pass). Degree Credit.
Units: 0.5 - 3
Hours/semester: 24-162 Lab
Recommended: Eligibility for READ 836 and ENGL 836; or ENGL 847 or ESL 400.
Transfer Credit: CSU