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 structured programming with C/C++; data types, variables, expressions, selection and repetition structures, functions passing by value and reference, recursion, all about arrays, file input and output(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; 48-54 Lab; 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 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, file I/O, OOP and other core concepts are covered. Applications focus on computational techniques to understand 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 ENGL 100.  
**Transfer Credit:** CSU, UC  
**C-ID:** COMP 122

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CIS 242 COMPUTER ARCHITECTURE AND ASSEMBLY LANGUAGE
Covers the basics of integrated circuit technology, digital logic gates and circuit design, computer organization and industry standard computer architecture (ISA), 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 112
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
Prerequisites: CIS 284 or equivalent experience programming in JAVA.
Recommended: Eligibility for ENGL 100.
Transfer Credit: CSU, UC

C-ID: COMP 122

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
Prerequisites: CIS 284 or equivalent experience programming in JAVA.
Recommended: Eligibility for ENGL 100.
Transfer Credit: CSU, UC

C-ID: COMP 132

CIS 295 INTRODUCTION TO CLOUD COMPUTING
An introduction to Amazon Web Services (AWS) and cloud computing, which shift information systems from physical infrastructure to the internet. Explains how to evaluate business and technical benefits of AWS and cloud computing and cloud applications. Includes an analysis of storage, servers, and software applications, as well as a discussion of job opportunities. 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

C-ID: COMP 122

CIS 296 DATABASE ESSENTIALS IN THE CLOUD
Amazon Web Services (AWS) and cloud database management, which support multiple data storage options. Definitions, operations, and scaling of SQL (Structured Query Language) and noSQL data storage. Considers 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 152

CIS 326 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
factors to balance and design data storage. 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 AMAZON WEB SERVICES (AWS) AND
CLOUD COMPUTE ENGINES
Explore how Amazon Web Services (AWS) and other
cloud computing systems are built using a common set
of core technologies, algorithms, and design principles
centered around distributed systems. Students 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 Amazon
Web Services (AWS) and other cloud computing services
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
Corequisites: Completion of, or concurrent enrollment in,
CIS 284
Recommended: Eligibility for ENGL 100.
Transfer Credit: CSU

CIS 298 AMAZON WEB SERVICES (AWS) AND
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 Amazon Web Services (AWS)
and cloud infrastructures are 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 321 IPHONE PROGRAMMING: SWIFT
Introduction to programming the iPhone or iPad.
Introduction to programming concepts, variables,