

Course Descriptions for Courses Offered by the CS Program

CSCI 104 Introduction to Computing (3:3:0)

This course serves as an introduction to the field of computer science and the computer's various layers. The course provides exposure to the following layers: information, hardware, programming, operating systems, applications, and communications. Additional topics include ethics, security, privacy, the impact of computing, and widely used software applications.

CSCI 112 Introduction to Computer Programming (3:3:0) **Co-requisite(s): CSCI 113**

This course introduces students to computers and programming languages and more specifically the C++ language. Besides, students learn to use computer programming as a problem-solving tool. The topics covered include basic operations, data types, input/output, selection statements, control structures, arrays, functions, and strings.

CSCI 113 Introduction to Computer Programming Lab (1:0:3) **Co-requisite(s): CSCI 112**

This course introduces the use of computer programming as a problem-solving tool in laboratory environment. Topics in procedural programming include, simple data types, input/output, selection statements, control loops, testing, debugging, and programming environments.

CSCI 211 Object Oriented Programming (3:3:0) **Pre-requisite(s): CSCI 112**

This course is an introduction to object-oriented programming principles and techniques using Java. Topics include Java elementary programming, and Java object-oriented features such as methods, objects, classes, access modifiers, constructors, immutable objects & classes, abstraction, encapsulation, inheritance, polymorphism, dynamic binding, object castings, abstract and interface classes, and exception handling.

CSCI 215 Data Structures and Algorithms (3:3:0) **Pre-requisite(s): CSCI 211 and MATH 225**

This course introduces data structures and various fundamental computer science algorithms. The course covers abstract data-type concepts, stacks, queues, lists, and trees. Several sorting and searching algorithms are covered. Additional topics include an introduction to graphs and their implementation and running time and time complexity measurement.

CSCI 232 Computer Organization (3:3:0) **Pre-requisite(s): CSCI 112**

This course provides a programmer's view of the execution of programs in computer systems. Topics covered include instruction sets, machine-level code, assembly language, performance evaluation and optimization, memory organization and management, address translation, and virtual memory.

CSCI 312 Operating System Fundamentals (3:3:0)
Pre-requisite(s): CSCI 215

This course covers the principles, components, and design of modern operating systems, focusing on the UNIX platform. Topics include system structure, process concept, multithreaded programming, process scheduling, synchronization, atomic transaction, deadlocks, memory management, and file system.

CSCI 315 Design and Analysis of Algorithms (3:3:0)
Pre-requisite(s): CSCI 215

This course introduces the design and analysis principles for various algorithms. The topics covered include searching algorithms, dynamic programming, greedy algorithms, Huffman coding, graph traversing algorithms, shortest path algorithms, linear programming, and NP-completeness.

CSCI 326 Database Systems (3:3:0)
Pre-requisite(s): CSCI 211

This course is an introductory course on database management systems. The goal of the course is to present a comprehensive introduction to the use of data management systems. Some of the topics covered are the following: The Entity-Relationship Model, the Relational Data Model, the SQL language, the database design, and the database integrity and security.

CSCI 372 Compiler Design (3:3:0)
Pre-requisite(s): CSCI 232

The course provides an introduction to the theory and practice of compilation. Topics include compiler architecture, components, phases, software tools, lexical roles and specifications, regular expressions, syntax roles and specifications, context-free grammars, top-down parsing, bottom-up parsing, LR parsers & parse trees, syntax directed translation, syntax tree, abstract syntax tree, and finite automata.

CSCI 388 Programming Languages (3:3:0)
Pre-requisite(s): CSCI 215

This course is an introduction to basic concepts in the design of programming languages. The course focuses on programming languages within the functional and logic programming paradigms such as Scheme and Prolog. Topics include history of programming languages, language design criteria, functional programming, syntax, logic programming, semantics, and object-oriented principles.

CSCI 440 Formal Methods (3:3:0)
Pre-requisite(s): CSCI 388

This course introduces formal methods of software engineering. Formal methods are best described as a variety of mathematical modeling techniques, which are used to model the behavior of a computer system and to verify required functionality and design safety. The course covers formal methods modelling, specifications, and verification aspects (in different tools) to ensure the correctness of a software system.

CSCI 450 Information Security and Privacy (3:3:0)
Pre-requisite(s): CSCI 215 or Instructor permission

This course is a survey of information security considerations as they apply to information systems analysis, design, and operations. Topics include information security vulnerabilities, threats, and risk management. Furthermore, the course introduces several cryptographic algorithms in addition to the privacy and secrecy of statistical databases and e-government applications.

CSCI 462 Data Communications and Computer Networks (3:3:0)
Pre-requisite(s): CSCI 112

This course introduces computer networks. Topics include layering approach, functions of different layers, Internet applications (HTTP, DNS), reliable and unreliable transport (TCP and UDP), routing and IP addressing, data link layer services and protocols, and Ethernet.

CSCI 463 Data Communications and Computer Networks Lab (1:0:3)
Co-requisite(s): CSCI 462

This course provides students with hands on training on design, troubleshooting, modeling and evaluating of computer networks. Topics include network addressing, Address Resolution Protocol (ARP), basic troubleshooting tools, IP routing, and route discovery. Additionally, student will perform network modeling, simulation, and analysis using Packet tracer and WireShark analyzer.

CSCI 492 Senior Design Project I (2:0:6)
Pre-requisite(s): Senior standing

The course requires seniors to work in small teams to solve significant problems. Over the duration of CSCI 492 and CSCI 493, students design, implement, and evaluate a solution to the problem in conjunction with a faculty advisor. The course reinforces programming principles and serves as a capstone for computing knowledge obtained in the BSCS curriculum. The recognition of the ethical and legal principles are also aspects of the course.

CSCI 493 Senior Design Project II (4:0:12)
Pre-requisite(s): CSCI 492

Implementation of the project for which preliminary work was done in CSCI 492. Project includes designing and constructing software and/or hardware, conducting experiments or studies, and testing and validating a complete system. At the end of the term, each team presents to a committee information related to its project in both written and oral formats.

CSCI 499 Special Topics in Computing

(3:3:0)

Pre-requisite(s): CSCI 215

This course gives instructors the opportunity to cover the latest developments and contemporary issues in computing. Instructors will provide a detailed course outline at the beginning of the semester.