

CS 04.103: 4 s.h. Computer Science and Programming

This course emphasizes programming methodology, algorithms and simple data structures. A programming language rich enough to allow easy implementation of data structures is studied. Prior programming experience in any programming language is expected for this course.

CS 04.110: 3 s.h. An Introduction to Programming Using Robots

Prerequisites: CS 01100 or CS 01050 Minimum Grade of P or Computer Competency Exam 70

This course teaches fundamental programming skills centered in the context of robot programming. Students will program small robots to perform a variety of tasks. In addition to learning a sophisticated programming language, students will gain skills in design techniques and experience working in teams to build complex systems.

CS 04.112: 1 s.h. Java for Object Oriented Programmers

Prerequisites: CS 04103

This course is designed for students who have substantial programming experience in an object-oriented language, such as C++, but who need to learn Java as prerequisite knowledge for other courses in the curriculum. Students will study the syntax and semantics of Java, specifically, classes and objects, abstraction, encapsulation, data types, calling methods and passing parameters, decisions, loops, arrays and collections, documentation, testing and debugging, exceptions, design issues, inheritance, and polymorphic variable.

CS 04.113: 4 s.h. Introduction to Object Oriented Programming

Prerequisites: MATH 01121 or MATH 01122 or MATH 01125 or MATH 01130 or MATH 01131

Introduces the fundamental concepts of programming from an object-oriented perspective. Topics are drawn from classes and objects, abstraction, encapsulation, data types, calling methods and passing parameters decisions, loops, arrays and collections, documentation, testing and debugging, exceptions, design issues, inheritance and polymorphic variables and methods, The course emphasizes modern software engineering and design.

CS 04.114: 4 s.h. Object Oriented Programming and Data Abstraction

Prerequisites: CS 04113 or CS 04103 and CS 04112 Objects and data abstraction continues from Introduction to Object-Oriented Programming to the methodology of programming from an object-oriented perspective. Through the study of object design, this course also introduces the basics of human-computer interfaces, graphics, with an emphasis on software engineering. A second operating system/programming platform is introduced.

CS 04.115: 1 s.h. C++ for Java Programmers

Prerequisites: CS 04113 This course is designed for students who have substantial programming experience in an object-oriented language such as Java, but who wish to learn C++, a language that is still commonly used in research and industry. Students will study the syntax and semantics of C++, pointers, classes (inheritance, encapsulation, polymorphism, methods, etc.), control structures, file processing, and GUI programming.

CS 04.140: 4 s.h. Enterprise Computing I

Prerequisites: CS 01100 or CS 01050 and MATH 01123 or MATH 03125 This course will acquaint students with data representation, data organization and data storage utilizing basic data structures. Students will perform basic file manipulation by reading data from files, writing data to files and data file formatting. Students will also understand basic logic, basic object oriented design and programming and the concepts of software engineering.

CS 04.140: 4 s.h. Enterprise Computing II

Prerequisites: CS 04140 This course is designed to extend the material presented in Enterprise Computing I by applying object oriented design and software engineering principles to develop a small scale enterprise system. This course will acquaint students with advanced features and data structures. Students will also understand basic graphical programming, event driven programs, exception handling and web programming.

CS 04.222: 4 s.h. Data Structures and Algorithms

Prerequisites: CS 04114 and MATH 03160 or CS 04114 and CS 04112 Minimum Grade of A- and CS 04103 Minimum Grade of A-

This course features programs of realistic complexity. The programs utilize data structures (string, lists, graphs, stacks, trees) and algorithms (searching, sorting, etc.) for manipulating these data structures. The course emphasizes interactive design and includes the use of microcomputer systems and direct access data files

CS 04.225: 3 s.h. Data Structures for Engineers

Prerequisites: CS 04103 and MATH 01236

The course features programs of realistic complexity. The programs utilize data structures (strings, lists, graphs, stacks) and algorithms (searching, sorting, etc.) for manipulating these data structures. The course emphasizes interactive design and includes the use of microcomputer systems and direct access data files.

CS 04.233: 3 s.h. Structured Design and Programming Using COBOL

Prerequisites: CS 01102 or CS 04113 or CS 04103 In this course students learn to write structured programs in COBOL. It includes a description of the language and a comparison with other languages. It emphasizes structured modular programming and documentation such as hierarchy charts (HIPO) and flow charts. Prior programming experience in any programming language is expected for this course.

CS 04.234: 3 s.h. Advanced Structured Design and Programming Using COBOL

Prerequisites: CS 04233 This course prepares students for professional proficiency in the COBOL programming language, and includes structured and modular programming, top-down design, hierarchy charts and flow diagrams, table handling, sorting, searching, report preparation, character manipulation, sequential and ISAM files, programming standards and the transaction-master update problem.

CS 04.305: 3 s.h. Web Programming

Prerequisites: CS 01205 and CS 04222 This course introduces the student to some of the underlying software components of the World Wide Web as it currently exists. Topics include markup languages, scripting languages, programming languages such as Java, and other software components of the Web.

CS 04.315: 3 s.h. Programming Languages

Prerequisites: CS 04222 and CS 06205

A study of the fundamental principles underlying the design of programming languages. Students will study two or more languages from contrasting programming paradigms such as Functional, Object-Oriented, Logical, or Concurrent.

CS 04.325: 3 s.h. Programming in Ada

Prerequisites: CS 04222 Students will gain an understanding of the major concepts of the programming language Ada. They will learn how the constructs of the Ada language can be used to produce software which is portable, readily maintained and modified, and efficiently designed. Students will do several programming projects in Ada, and will be exposed to problems in the design of real-time systems and concurrent programming.

CS 04.327: 3 s.h. Power Java

Prerequisites: CS 04222 This advanced programming course explores the power of the Java programming language. It looks at the advanced features provided in Java: reflection and proxies, interfaces and inner classes, graphics programming, the event listener model, event handling, Swing user interface components, graphical user interface design, object serialization, multithreading, network programming, remote objects and remote method invocation, collection classes, database connectivity, and JavaBeans.

CS 04.380: 3 s.h. Object Oriented Design

Prerequisites: CS 07340

This course will introduce important concepts, such as inheritance and polymorphism, which are crucial tools needed for crafting object-oriented solutions to real-world problems. Design patterns that commonly occur in design situations will be covered. A formal notation for describing and evaluating object-oriented designs such as the Unified Modeling Language (UML) will be taught. Students will apply the concepts to design and implement object-oriented solutions to one or more reasonably sized real-world problems.

CS 04.390: 3 s.h. Operating Systems

Prerequisites: CS 04222 and CS 06205

The course concentrates on the design and functions of the operating systems of multi-user computers. Its topics include time sharing methods of memory allocation and protection, files, CPU scheduling, input-output management, interrupt handling, deadlocking and recovery and design principles. The course discusses one or more operating systems for small computers, such as UNIX.

CS 04.391: 3 s.h. Concurrent Programming

Prerequisites: CS 04390

Introduces the motivation for and fundamental concepts of concurrent programming. Topics include processes, threads, context switching, atomic instructions/actions, shared data, race conditions, critical sections, mutual exclusion, synchronization, locks, barriers, semaphores, monitors, shared-memory, multiprocessors, and an overview of distributed programming (distributed-memory multicomputers, interprocess communication, message passing, remote procedure call, rendezvous). The course includes developing concurrent programming skills by using a language that supports the multithreaded program.

CS 04.392: 3 s.h. System Programming and Operating System Internals

Prerequisites: CS 04390 and CS 01205 This course examines the system kernel of a modern operating system including the file structure and implementation, the process structure and process scheduling, memory management policies, and the I/O subsystem. This course also covers the system call interface to the system kernel and various inter-process communication schemes.

CS 04.394: 3 s.h. Distributed Systems

Prerequisites: CS 06205 and CS 04222 or ECE 09242 and CS 04225 This course will introduce students to the Distributed System—a network of (possibly autonomous) computers that cooperatively solve single problems or facilitate parallel execution of related tasks. Key topics of study include Distributed Systems Architecture, Distributed Resource Management, and Accessing Distributed Resources. Students will participate in algorithm, process and system design for distributed systems.

CS 04.400: 3 s.h. Computer Science Senior Project

Prerequisites: CS 04315 and CS 07340 This is an advanced programming course in which students work on large-scale individual or team programming projects and make a formal presentation on their work. The course discusses program development, methodologies and strategies.

CS 04.401: 3 s.h. Compiler Design

Prerequisites: CS 04315 and CS 07210

This course presents theory of compiler design, syntax-directed translation, and code generation. Students design a compiler for a subset of a high-level programming language.

CS 04.430: 3 s.h. Database Systems: Theory and Programming

Prerequisites: CS 07340 This course focuses on the design of DBMS and their use to create databases. The course covers both the theoretical concepts and the implementation aspects of database systems with a special emphasis on relational database systems, SQL, programming (in a modern programming language such as C++ or Java) using a real database Application Programming Interface (such as JDBC or ODBC)