
Computer Science

Professors:

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Associate Professor:

Donald R. Schwartz, Ph.D., Chair

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Requirements for major: Students may complete a major in computer science with a concentration in either computer science or computer information systems. The computer science concentration is intended to prepare students for graduate studies or technical careers in computing, while the concentration in computer information systems prepares students for careers that involve the applications of computing. All students pursuing the major must take eleven courses (44 semester hours), including Computer Science I, Computer Science II, Computer Organization and Machine Programming, Data Structures and Algorithms, and both semesters of Seminar. In addition, majors must take courses specific to their concentration as described below.

A. Computer science concentration: One of Computer Graphics, Computer Architecture, or Theory and Design of Operating Systems; two Computer Science courses numbered 3000 or higher; two additional computer science or mathematics courses numbered 3000 or higher; and Mathematics 2310: Introduction to Advanced Mathematics.

B. Computer information systems concentration: Systems Analysis and Design; Math 1150: Elementary Statistics; two computer science courses numbered 3000 or higher; and two additional courses from the following list: any computer science or mathematics course numbered 3000 or higher, Accounting 2000, Management 3000, Quantitative Management 3000.

A grade of C- or higher is required for any computer science course required for the major. All requirements for the major not taken at Millsaps must be approved in advance by the department chair.

Requirements for minor: Students may elect a minor in computer science with Computer Science I, Computer Science II, and at least two computer science courses numbered 2000 or higher. A grade of C- or higher is required for any computer science course required for the minor.

Courses

1000 Problem Solving with Computer Software (4 sem. hours). Introduction to the use of computer software and hardware including introduction to operating systems, editors, electronic mail, word processing, spreadsheets, relational databases, and statistical packages available on the campus network. This course emphasizes problem solving in the utilization of computer resources.

1010 Computer Science I (4 sem. hours). An introduction to algorithms and computer programming. Basic programming constructs, data structures, recursion, and

graphical user interface construction. Prerequisite: Mathematics 1100 (college algebra) or equivalent.

1020 Computer Science II (4 sem. hours). A continuation of Computer Science I. Topics include linked lists, stacks and queues, trees and graphs, sorting algorithms, algorithm analysis, data abstraction, and software engineering. Prerequisite: Computer Science 1010.

2100 Computer Organization and Machine Programming (4 sem. hours). An introduction to the architecture and operation of a computer system. Includes data representation, assembly language programming, addressing methods, subroutines, assemblers, and linkers. Prerequisite: Computer Science 1020.

2300 Data Structures and Algorithms (4 sem. hours). Algorithm design, analysis, and implementation. Topics include specialized trees and graphs, advanced searching and sorting, priority queues, complexity analysis, and algorithm design techniques. Prerequisite: Computer Science 1020.

2440 Multimedia Principles and Design (4 sem. hours). Principles and methods of multimedia systems. Case studies, team exercises, and the use of multimedia development and authoring tools. Laboratory work focuses on multimedia course ware development. Prerequisite: Computer Science 1000 or Computer Science 1010 or departmental approval.

2750-2753 Selected Topics (1, 2, 3 or 4 sem. hours). This course addresses areas not necessarily covered in other courses and allows the department to introduce new topics into the curriculum. Offered Occasionally.

3100 Data Communications and Networks (4 sem. hours). Theoretical and practical factors in data communications including historical aspects, communications equipment, transmission media, protocols, error effects, topologies, architectures, and network strategies. Laboratory experience in network development and management. Prerequisite: Computer Science 1020.

3110 Computer Architecture (4 sem. hours). Comparative architectures, systems structure and evaluation, memory and process management, resource allocation, protection, concurrent processes, and current trends in system design and operations. Prerequisite: Computer Science 2100.

3210 Systems Analysis and Design (4 sem. hours). System development life cycle, CASE tools, decision tables, data collection and analysis, systems planning and design, computer system evaluation and selection, and implementation of systems. Prerequisite: Computer Science 2300.

3220 Database Management (4 sem. hours). Database concepts, organization and applications, database management systems, and the implementation of various databases. Prerequisite: Computer Science 1020.

3300 Theory and Design of Operating Systems (4 sem. hours). Process scheduling, process synchronization, multi-threaded programming, memory management, file management, and hands-on introduction to the LINUX operating system. Prerequisite: Computer Science 2100 and Computer Science 2300.

3310 Automata, Computability, and Compiler Theory (4 sem. hours). Automata, Turing machines, theory of computation, techniques of compiler design, lexical analysis

and parsing, and classification of grammars. Prerequisite: Computer Science 2300.

3400 Artificial Intelligence (4 sem. hours). Autonomous agents, finite-state machines, state-space search, game trees, path planning, and optimization techniques such as hill-climbing and genetic algorithms. Prerequisite: Computer Science 2300. Offered Occasionally.

3410 Computer Graphics (4 sem. hours). Color theory, two- and three-dimensional transformations, clipping, parallel and perspective projections, hidden-surface removal, and shading. Prerequisite: Computer Science 2300 and Mathematics 1220.

3440 Multimedia Systems and Applications (4 sem. hours). An exploration into advanced features of multimedia and the Internet, including compression, event synchronization, storage, and networked applications. Tools for multimedia design, development, and evaluation. The course contains a laboratory component. Prerequisite: Computer Science 1010 and Computer Science 2440.

3500 Discrete Structures (4 sem. hours). Topics covered include predicate logic, algorithms, modular arithmetic, counting techniques, recurrence relations, graph theory, and trees. Prerequisite: Mathematics 2230 and 2310. (This course is the same as Math 3560.)

3600 Software Engineering (4 sem. hours). Design, construction, and maintenance of large software systems. Topics include project planning, requirements analysis, software design methodologies, software implementation and testing, maintenance, and software metrics. Prerequisite: Computer Science 1020.

3620 Rapid Application Development (4 sem. hours). Software development in the rapid development/rapid prototype realm. Topics include user-interface design strategies, software engineering, object-oriented programming, graphics, and database access. Prerequisite: Computer Science 1020.

3750–3753 Selected Topics (1, 2, 3, or 4 sem. hours). This course addresses areas not necessarily covered in other courses and allows the department to introduce new topics into the curriculum.

3800–3803 Directed Study (1, 2, 3, or 4 sem. hours).

4902–4912 Seminar (2–2 sem. hours each). Discussion of current problems and trends in computing. Design and implementation of a senior project. Prerequisite: consent of instructor.