

## Computer Science - Course Descriptions

### Core Courses:

**CSCI 545 Advanced Data Communications - 3 semester hours** **F/Sp**  
Topics include classification of data communication systems, developments in communication technologies, routing models and algorithms, performance analysis in data networks, and modeling and simulation of large-scale networks.  
**Prerequisite:** CSCI 445 or its equivalent

**CSCI 488/588 Advanced Systems Architecture - 3 semester hours** **F/Sp**  
A study of computer architecture with an emphasis on a quantitative approach to cost/performance design tradeoffs, including the fundamentals of uniprocessors and multiprocessors, scheduling, speculation, and multithreading.  
**Prerequisite:** CSCI 388 or its equivalent

**CSCI 560 Embedded Systems - 3 semester hours** **Sp**  
An introduction to embedded systems with emphasis on applications. Students will program a microcontroller using a complete development system.  
**Prerequisite:** CSCI 388 or its equivalent

**CSCI 592 Advanced Algorithms - 3 semester hours** **F/Sp**  
An investigation of the classification of algorithms with emphasis on design and analysis of complexity. Topics include approximation, sorting, searching, optimization, randomize algorithms, and NP completeness.  
**Prerequisite:** CSCI 492 or its equivalent

### Elective Courses:

**CSCI 456/556 Advanced Database Applications - 3 semester hours** **F**  
Applications of advanced database systems. Students will work on a series of projects using industry standard software.  
**Prerequisite:** CSCI 356 or its equivalent

**CSCI 602 Advanced Artificial Intelligence - 3 semester hours** **F/Sp**  
Topics include Machine Learning, Knowledge Representation and Discovery, Neural and Evolutionary Computation, and Intelligent Agents and Multi-Agent Systems  
**Prerequisite:** CSCI 402 or its equivalent

**CSCI 647 Wireless Networks and Mobile Computing - 3 semester hours** **Alternate F**  
Fundamentals of wireless networks and mobile computing, protocols, quality of service in wireless networks, and applications in wireless and mobile networks including distributed applications, middleware, mobile transactions, mobile multimedia, and remote execution.  
**Prerequisite:** CSCI 445 or its equivalent; CSCI 645

**CSCI 660 Automata and Formal Language - 3 semester hours** **Sp**  
The study of three mutually related topics: Languages, machines, and computability.  
Key topics include regular languages, finite automata, determinism and non-determinism in finite automata, pattern matching, context-free languages, push-down automata, Turing machines, resource-bounded computation.  
**Prerequisite:** CSCI 460 or its equivalent

**CSCI 670 Computer Security - 3 semester hours****Alternate Sp**

Key concepts and algorithms involved in cryptography and computer security. Includes intrusion detection, firewalls, and digital signatures.

**Prerequisite:** CSCI 445 or its equivalent

**CSCI 680 Algorithmic Graph Theory - 3 semester hours****Alternate F**

Investigate a variety of graph algorithms, both sequential and parallel, known to have applications to such areas as scheduling, robotics, computational geometry, VLSI design, and pattern recognition. The students will learn graph algorithms both sequential and parallel in a hybrid.

**Prerequisite:** MATH 490 or its equivalent

**CSCI 682 Computer Modeling and Animation - 3 semester hours****Alternate F**

Applications of 3D computer graphics including modeling, transformations, and animation. Students will work on a series of projects using industry standard software.

**Prerequisite:** CSCI 480 or its equivalent

**CSCI 685 Software Engineering - 3 semester hours****Alternate Sp**

This course covers software engineering tools, models/methodologies, use case analysis, user interface design, estimation and scheduling, and software maintenance. It also covers software requirements analysis and specification, software design, software testing, software post-delivery maintenance, software verification, validation, and documentation.

**Prerequisite:** CSCI 487 or its equivalent

**CSCI 687 Advanced Software Development - 3 semester hours****F/Sp**

The purpose of this course is to provide a basic concepts and principles of the software life cycle with emphasis on software design, development, and implementation. It also examines current issues in software development, software architectures, requirements specification, Quality control and metrics, and software project management. Some of the industry life-cycle models are presented, with examples of their use.

**Prerequisite:** CSCI 487 or its equivalent

**CSCI 689 Software Quality Assurance - 3 semester hours****Alternate Sp**

This course covers a variety of topics related to software quality assurance including: activities performed by external participants, activities to project schedules and budget control, risk management, and costs associated with SQA. It also focuses on the methods and techniques in software testing and quality assurance.

**Prerequisite:** CSCI 685

**CSCI 693 Parallel Algorithms - 3 semester hours****F**

An introduction to parallel programming with emphasis on models and algorithms. Topics include communication complexity, tree balancing, partitioning and tree contraction, parallel version of graph, parallel sorting and searching, Omega and Batcher networks. Students are expected to be able to solve problems using different programming paradigms.

**Prerequisite:** CSCI 692

**CSCI 695 Data Mining - 3 semester hours****Sp**

A study of knowledge discovery from data with emphasis on theory and application. Topics include data mining techniques such as clustering, classification and association rules, applications such as decision support and failure analysis, and case studies from domains such as engineering.

**Prerequisite:** CSCI 692 and CSCI 356 or its equivalent

**CSCI 570 Computer Simulation - 3 semester hours****Alternate Sp**

Advanced applications of discrete and continuous simulation modeling.

**Prerequisite:** CSCI 387 or its equivalent; STAT 340 or its equivalent

**CSCI 694 Algorithms for VLSI - 3 semester hours** **Alternate Sp**  
Design and analysis of algorithms for design of VLSI circuits, VLSI test and simulation.  
**Prerequisite:** CSCI 388 or its equivalent

**CSCI 600 Thesis I - 3 semester hours** **F/Sp**  
Research on a thesis that represents an original contribution with publishable results.  
**Prerequisite:** Approval of graduate committee

**CSCI 601 Thesis II - 3 semester hours** **F/Sp**  
Research on a thesis that represents an original contribution with publishable results. A student shall not receive credit for CSCI 601 until the graduate committee approves the draft copy of the thesis.  
**Prerequisite:** CSCI 600

**CSCI 605 Master Project - 4 semester hours** **F/Sp**  
A master's project should include the introduction of new software tools, a novel capability using existing technology, or a novel survey of an area, or require substantial scientific computation. A report must be submitted and approved by the graduate committee.  
**Prerequisite:** Approval of graduate committee

**CSCI 610 Graduate Seminar I - 1 semester hour** **F/Sp**  
Students present their work for their master's project or thesis.  
**Prerequisite:** 12 credits at in computer science at the 500 level (or higher) or permission of Chair of graduate committee

**CSCI 611 Graduate Seminar II - 1 semester hour** **F/Sp**  
Students present their work for their master's project or thesis.  
**Prerequisite:** CSCI 610.

**CSCI 639 Independent Study in Computer Science - 3 semester hours**

**CSCI 640, 641, 642, 643 Special topics in Computer Science - 3 semester hours** **Alternate F**  
An introduction to a special topic with applications. Students will work on a series of projects using current technology. This course may be repeated for additional credit provided the topic is substantially different than any prior course including transferred credit.  
**Prerequisite:** Permission of instructor