

COMPUTER SCIENCE (CS)

 - General Education Course

CS 105 Expl World with Computing (CT) 3 Credit hours

Central principles and big ideas of computing: problem-solving, computational and critical thinking, abstraction, creativity, reasoning, data, algorithms, recursion, visualization, and limits of computation. Solve real-world problems with computing.

Pre-req: ACT Math with a score of 17 or SAT Verbal Before March 16 with a score of 400 or SAT MATH SECTION SCORE with a score of 440 or Placement Math After SP17 with a score of 101 or MTH 102 with a minimum grade of C or MTH 102B with a minimum grade of C or MTH 127 with a minimum grade of C or MTH 130 with a minimum grade of C or MTH 132 with a minimum grade of C or MTH 229 with a minimum grade of C or MTH 229H with a minimum grade of C.

Attributes: Critical Thinking, Digital Humanities

Grade Mode: Normal Grading Mode

CS 110 Computer Science I 3 Credit hours

Pre-req: ACT Math with a score of 24 or SAT Mathematics Before Mar. 16 with a score of 560 or SAT MATH SECTION SCORE with a score of 580 or MTH 127 or MTH 130 and MTH 132 (may be taken concurrently) or MTH 229 (may be taken concurrently) or MTH 229H (may be taken concurrently).

Concurrent PR: MTH 132 or MTH 229 or MTH 229H

Attributes: Digital Humanities

Grade Mode: Normal Grading Mode

CS 110H Computer Science Honors 3 Credit hours

Object-oriented and algorithmic problem solving principles and techniques; programming with classes in an integrated programming environment; and program debugging.

Pre-req: ACT Math with a score of 24 or SAT Mathematics Before Mar. 16 with a score of 560 or SAT MATH SECTION SCORE with a score of 580 or MTH 127 or MTH 130 and MTH 132 (may be taken concurrently) or MTH 129 (may be taken concurrently) or MTH 129H (may be taken concurrently).

Concurrent PR: MTH 132 or MTH 129 or MTH 129H

Grade Mode: Normal Grading Mode

CS 120 Computer Science II 3 Credit hours

Object-oriented analysis and design, advanced programming with classes, arrays, strings, sorting, searching, I/O, GUI development, system life cycle and software development methodologies. CR/PR: CS 110

Pre-req: CS 110 with a minimum grade of D or CS 110H with a minimum grade of D.

Attributes: Digital Humanities

Grade Mode: Normal Grading Mode

CS 205 Scientific Computing 3 Credit hours

An introduction to computer programming, software design, and algorithm analysis and implementation. Abstract concepts illustrated with examples and exercises drawn from the mathematical and physical sciences. Primarily for non-CS majors.

Pre-req: MTH 140 or MTH 229 (may be taken concurrently) or MTH 229H (may be taken concurrently).

Concurrent PR: MTH 229 or MTH 229H

Grade Mode: Normal Grading Mode

CS 210 Data Structures and Algorithms 3 Credit hours

Design and implementation of data structures including stacks, queues, lists, trees, heaps, balanced trees, and graphs. Other topics include hashing, threading, data parsing, program testing, correctness, efficiency, and exceptions.

Pre-req: CS 120 with a minimum grade of D and MTH 220 (may be taken concurrently) with a minimum grade of D.

Concurrent PR: MTH 220

Grade Mode: Normal Grading Mode

CS 215 Adv Data Struct and Algorithms 3 Credit hours

Advanced techniques for designing and analyzing algorithms, including asymptotic analysis; data structures; divide-and-conquer algorithms and recurrences; greedy algorithms; dynamic programming; graph algorithms; randomized algorithms; and NP-complete problems.

Pre-req: CS 210 with a minimum grade of D and (MTH 229 with a minimum grade of D or MTH 229H with a minimum grade of D) and MTH 220 (may be taken concurrently) with a minimum grade of D.

Concurrent PR: MTH 220

Grade Mode: Normal Grading Mode

CS 280 Special Topics 1-4 Credit hours

EMERGING TOPICS IN COMPUTER SCIENCE.

Grade Mode: Normal Grading Mode

CS 281 Special Topics 1-4 Credit hours

EMERGING TOPICS IN COMPUTER SCIENCE.

Grade Mode: Normal Grading Mode

CS 282 Special Topics 1-4 Credit hours

EMERGING TOPICS IN COMPUTER SCIENCE.

Grade Mode: Normal Grading Mode

CS 283 Special Topics 1-4 Credit hours

EMERGING TOPICS IN COMPUTER SCIENCE.

Grade Mode: Normal Grading Mode

CS 300 Programming Languages 3 Credit hours

Pre-req: CS 210 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CS 305 Software Engineering 3 Credit hours

This course provides a broad introduction to software engineering theories, methods, and tools. Requires substantial writing. Topics include requirements engineering, analysis and design, implementation, versioning, and testing.

Pre-req: MTH 220 and CS 210 and ENG 354 (may be taken concurrently).

Concurrent PR: ENG 354

Grade Mode: Normal Grading Mode

CS 310 Software Engineering II 3 Credit hours

Pre-req: CS 305 with a minimum grade of D.

Grade Mode: Normal Grading Mode

CS 315 Software Quality Assurance 3 Credit hours

Testing techniques and validation of system requirements. Design reviews and code inspections; unit, integration, system, regression, load, stress, user acceptance, and regression testing; statistical testing; test strategies and project metrics.

Pre-req: CS 310 and MTH 345.

Grade Mode: Normal Grading Mode

- CS 320 Internetworking** **3 Credit hours**
Principles and issues in interconnecting multiple physical networks into a coordinated system, operation of internet protocols in the interconnected environment, and design of applications to operate in this environment.
Pre-req: CS 210 and (MTH 229 or MTH 229H).
Grade Mode: Normal Grading Mode
- CS 330 Operating Systems** **3 Credit hours**
Modern operating systems design and implementation: multi-tasking and time sharing, concurrency and synchronization, interprocess communication, resource scheduling, memory management, deadlocks, I/O, file systems, and security.
Pre-req: CS 210.
Grade Mode: Normal Grading Mode
- CS 351 Computer Sciences Co-Op** **0 Credit hours**
A supervised experience in which the student works for a company to gain practical experience in a students major.
Pre-req: ENGR 217 with a minimum grade of D.
Grade Mode: Credit/No Credit Grade Only
- CS 360 Automata and Formal Languages** **3 Credit hours**
Basic theoretical concepts are introduced, including finite state automata, regular expressions, context-free grammars, pushdown automata, Turing machines, recursively enumerable languages, the halting problem, and the Church-Turing thesis.
Pre-req: MTH 220 and CS 210.
Grade Mode: Normal Grading Mode
- CS 370 Computer Graphics** **3 Credit hours**
Mathematical theory and practical tools and techniques for generating realistic pictures using computers. This is a project-centered course and involves extensive programming using the open GL standard.
Pre-req: CS 210 with a minimum grade of D.
Grade Mode: Normal Grading Mode
- CS 402 Computer Architecture** **3 Credit hours**
Design and analyze structure of major hardware components of computers including: ALU, instruction sets, memory hierarchy, parallelism through multicore and many core, storage systems and interfaces.
Pre-req: CS 300 with a minimum grade of D.
Grade Mode: Normal Grading Mode
- CS 404 High Performance Computing** **3 Credit hours**
Software design and development targeting high performance computing architectures. Multi-core and many-core systems: I/O, file systems, performance metrics. Programming models include MPI, OpenMP, MapReduce, CUDA, OpenCL.
Pre-req: CS 402.
Grade Mode: Normal Grading Mode
- CS 405 Computing for Bioinformatics** **3 Credit hours**
Study of computational algorithms and programming techniques for various bioinformatics tasks including parsing DNA files, sequence alignments, tree construction, clustering, species identification, principal component analysis, correlations, and gene expression arrays.
Pre-req: CS 215.
Grade Mode: Normal Grading Mode
- CS 410 Database Engineering** **3 Credit hours**
Study of data models, data description languages, query languages including relational algebra and SQL, logical and physical database design, transactions, backup and recovery. Design and implementation of a database application.
Pre-req: CS 210 with a minimum grade of D.
Grade Mode: Normal Grading Mode
- CS 412 Embedded Systems** **3 Credit hours**
The design of systems containing embedded computers. Micro-controller technology, assembly language and C programming, input/output interfacing, data acquisition hardware, interrupts, and timing. Real-time operating systems and application programming. Application examples.
Pre-req: CS 402 with a minimum grade of D or EE 340 with a minimum grade of D.
Grade Mode: Normal Grading Mode
- CS 415 Data Mining** **3 Credit hours**
Covers (1) the process of knowledge discovery, (2) algorithms (association rules, classification, and clustering), and (3) real-world applications. Focuses on efficient data mining algorithms and scaling up data mining methods.
Pre-req: CS 215 and CS 410.
Grade Mode: Normal Grading Mode
- CS 425 Computational Intelligence** **3 Credit hours**
Genetic algorithms, evolutionary strategies, and genetic programming. Methods of knowledge representation using rough sets, type-1 fuzzy sets, and type-2 fuzzy sets. Neural network architectures and their learning algorithms.
Pre-req: CS 300.
Grade Mode: Normal Grading Mode
- CS 430 Cyber Security** **3 Credit hours**
Concepts and issues in physical and cyber security; technological vulnerabilities found in operating systems, database servers, web servers, internet, and local area networks; developing defensive and offensive security measures.
Pre-req: CS 320 with a minimum grade of D.
Grade Mode: Normal Grading Mode
- CS 435 Cyber Risk** **3 Credit hours**
Advanced course on the functions and purposes of the latest development in cyber security techniques and tools used to create, secure, protect and remediate cyber-infrastructures from various cyber threats.
Pre-req: CS 430 with a minimum grade of D or CS 340 with a minimum grade of D.
Grade Mode: Normal Grading Mode
- CS 440 Digital Image Processing** **3 Credit hours**
Mathematical techniques, algorithms, and software tools for image sampling, quantization, coding and compression, enhancement, reconstruction, and analysis.
Pre-req: CS 210 and MTH 329.
Grade Mode: Normal Grading Mode
- CS 452 Natural Language Processing** **3 Credit hours**
Fundamental algorithms and computational models for core tasks in natural language processing: word and sentence tokenization, parsing, information and meaning extraction, spelling correction, text summarization, question answering, and sentiment analysis.
Pre-req: (CS 215 and MTH 220).
Grade Mode: Normal Grading Mode

CS 455 Systems Engineering 3 Credit hours

Tools and techniques for optimizing the design and construction of software-intensive systems by considering system issues and making engineering tradeoffs in conflicting criteria and interacting decision parameters.

Pre-req: CS 330 and CS 340 and CS 350.

Grade Mode: Normal Grading Mode

CS 475 Internship 3-12 Credit hours

An in-depth and hands-on involvement in a real-world project under direct professional supervision. The project may be on-campus or off-campus. Requires prior approval of the internship director, who is a member of the computer science faculty.

Pre-req: CS 300 with a minimum grade of D or CS 215 with a minimum grade of D.

Grade Mode: Credit/No Credit Grade Only

CS 480 Special Topics 1-4 Credit hours

EMERGING TOPICS IN COMPUTER SCIENCE.

Grade Mode: Normal Grading Mode

CS 481 Special Topics 1-4 Credit hours

EMERGING TOPICS IN COMPUTER SCIENCE.

Grade Mode: Normal Grading Mode

CS 482 Special Topics 1-4 Credit hours

EMERGING TOPICS IN COMPUTER SCIENCE.

Grade Mode: Normal Grading Mode

CS 483 Special Topics 1-4 Credit hours

EMERGING TOPICS IN COMPUTER SCIENCE.

Grade Mode: Normal Grading Mode

CS 485 Independent Study 1-4 Credit hours

EMERGING TOPICS IN COMPUTER SCIENCE.

Grade Mode: Normal Grading Mode

CS 486 Independent Study 1-4 Credit hours

EMERGING TOPICS IN COMPUTER SCIENCE.

Grade Mode: Normal Grading Mode

CS 487 Independent Study 1-4 Credit hours

EMERGING TOPICS IN COMPUTER SCIENCE.

Grade Mode: Normal Grading Mode

CS 488 Independent Study 1-4 Credit hours

EMERGING TOPICS IN COMPUTER SCIENCE

Grade Mode: Normal Grading Mode

CS 490 🌱 Senior Project 3 Credit hours

Application of technical and professional skills in solving a real-world problem in a team environment. Discuss professional code of conduct, societal issues, and transition from student to industry professional.

Pre-req: CS 310 with a minimum grade of D and CS 410 with a minimum grade of D.

Attributes: Capstone Course

Grade Mode: Normal Grading Mode