COMPUTER SCIENCE (CSC)

CSC 100 The Beauty and Joy of Computing 3
A broad-based introduction to key concepts and principles of computer science. Exploration of seven big ideas of computing: creativity, abstraction, data, algorithms, programming, the Internet, and impact of computing.

CSC 101 Introduction to Computer Concepts 3
Introduction to computers and computing. Topics cover impact of computers on society, ethical issues, hardware, and software applications.

CSC 110 Computational Problem Solving 3
Using computing to apply mathematical concepts in developing algorithmic solutions to real-world problems, stressing analysis and logical reasoning. A modern programming language will be introduced for examples and assignments.

Notes: Non-Computer Science majors only or permission of instructor.

CSC 130 Introduction to Computer Science 3
Programming in a high-level language. Emphasis on problem analysis, problem-solving techniques, and software design principles and techniques.

Prerequisites: Acceptable score on the computer science placement test or a grade of at least C (2.0) in MAT 120, MAT 150, MAT 151, MAT 190, or MAT 191.

Notes: Computer Science majors should not take MAT 120.

GE Core: GMT

CSC 230 Elementary Data Structures and Algorithms 3

Prerequisites: Grade of at least C (2.0) in CSC 130.

CSC 237 Programming Language Laboratory 1-3
Syntax and use of a programming language. Language covered announced at preregistration.

Notes: May be taken twice for credit with permission of the Department Head.

CSC 250 Foundations of Computer Science I 3
An introduction to the fundamental ideas underlying contemporary computer science with a focus on the computation and construction of objects.

Prerequisites: Grade of at least C (2.0) in CSC 130 or permission of instructor.

CSC 261 Computer Organization and Assembly Language 3
Introduction to the organization of the computer through the use of Assembly Language programming. Data representation, parts of the computer system, Assembly Language fundamentals, instruction sets, memory, and floating-point operations.

Prerequisites: Grade of at least C (2.0) in CSC 230 and in CSC 250, or permission of instructor.

CSC 312 Ethics in Computer Science 1
Historical and social context of computing, ethical responsibilities of the computing professional, intellectual property rights, and risks and liabilities.

Prerequisites: Grade of at least C (2.0) in CSC 230 and in CSC 250, or permission of instructor.

Notes: Computer Science majors only.

CSC 330 Advanced Data Structures 3

Prerequisites: Grade of at least C (2.0) in CSC 230 and in CSC 250.

CSC 339 Concepts of Programming Languages 3
Concepts of block-structured, object-oriented, functional, logic, and concurrent programming languages. Comparative study of syntactic and semantic features of these languages and writing programs using them.

Prerequisites: Grade of at least C (2.0) in CSC 330.

CSC 340 Software Engineering 3
Practical and theoretical concepts of software engineering.

Prerequisites: Grade of at least C (2.0) in CSC 330.

CSC 350 Foundations of Computer Science II 3
High level concepts in the theoretical foundations of computer science.

Prerequisites: Grade of at least C (2.0) in CSC 250, or permission of instructor.

CSC 463 Basic Systems Administration Laboratory 1
Installing operating systems, peripherals, hardware, and software. Backups, recompiling the kernel (loading/unloading modules), providing Web services, and user administration.

Corequisites: CSC 562 and CSC 567. or permission of instructor.

CSC 464 Intermediate Systems Administration Laboratory 1
Topics selected from routing, firewall, Primary Domain Controller, Backup Domain Controller, Domain Controller trust, SAMBA, DNS round robin, and PPP connectivity setup.

Prerequisites: Grade of at least C (2.0) in CSC 463.

CSC 465 Advanced Systems Administration Laboratory 1
Automated installation, software installation, systems programming, system administration in a large organization. Projects will include departmental or university computer system work.

Prerequisites: Grade of at least C (2.0) in CSC 464.

CSC 471 Principles of Database Systems 3
Contemporary database systems. Emphasis on query processing, design, and implementation of applications in relational (SQL) databases. Introduction to other database models such as XML, object-oriented, and deductive.

Prerequisites: Grade of at least C (2.0) in CSC 330, or permission of instructor.

CSC 490 Senior Capstone 3
Application of classroom knowledge and skills in computer science to solve real-world problems and to develop research and development skills.

Prerequisites: Permission of instructor. student must be in the final semester of major coursework.

CSC 493 Honors Work in Computer Science 3
Research in a topic of special interest at the Honors level.

Prerequisites: Permission of instructor.

Notes: May be repeated for credit when topic changes.

CSC 495 Selected Topics in Computer Science 3
A topic of special interest is studied in depth.

Prerequisites: Junior standing and permission of instructor.

Notes: May be repeated for credit for a total of 6 s.h. when topic of study changes.
CSC 505 Data Science 3
Problem-based learning introduction to Data Science, including programming with data; data mining, munging, and wrangling; statistics, analytics, visualization; and applied machine learning, directed towards scientific, social, and environmental challenges.
Prerequisites: A grade of C or better in CSC 330 and (STA 271 or STA 290), or permission of instructor (prior programming and statistics experience is required).

CSC 510 Big Data and Machine Learning 3
Big data definitions and characteristics, computing environment for big data management and processing, machine learning models and algorithms, and scaling up machine learning (high dimensionality reduction).
Prerequisites: CSC 330. MAT 191; STA 271;
Corequisites: CSC 567. MAT 292.

CSC 523 Numerical Analysis and Computing 3
Number systems and errors, solutions of non-linear and linear systems, eigenvalue problems, interpolation and approximation, numerical differentiation and integration, solution of differential equations.
Prerequisites: Pr. grades of at least C (2.0) in CSC 130, CSC 350, and MAT 293, or permission of instructor.

CSC 524 Numerical Analysis and Computing 3
Continuation of CSC 523 with special topics in numerical analysis, emphasis on applied mathematics.
Prerequisites: Grade of at least C (2.0) in CSC 523.

CSC 526 Bioinformatics 3
Introduction to the problems and methods in Bioinformatics. Problem areas include restriction mapping, map assembly, sequencing, DNA arrays, and sequence comparison.
Prerequisites: Permission of instructor.

CSC 529 Artificial Intelligence 3
Logical foundations, knowledge representation and reasoning, search, and selected topics such as natural language processing and reasoning under uncertainty.
Prerequisites: Grade of at least C (2.0) in CSC 330 and CSC 350 or permission of instructor.

CSC 540 Human-Computer Interface Development 3
Survey of concepts and techniques for human-computer interface development. Topics include user-centered design, user interface programming, and usability evaluation.
Prerequisites: Grades of at least C (2.0) in CSC 340 or permission of instructor.

CSC 553 Theory of Computation 3
Finite state automata and regular expressions, context-free grammars, push-down automata and their use in parsing, overview of language translation systems, models for programming language semantics, computability and undecidability.
Prerequisites: Grade of at least C (2.0) in CSC 350. or permission of instructor.

CSC 555 Algorithm Analysis and Design 3
Sequential algorithm design and complexity analysis. Dynamic programming. Greedy algorithms. Graph algorithms. Selected advanced topics from NP-completeness; approximation, randomized, parallel, number-theoretic algorithms; Fast Fourier Transform; computational geometry; string matching.
Prerequisites: Grade of at least C (2.0) in CSC 330.

CSC 561 Principles of Computer Architecture 3
Hardware and software components of computer systems, their organization and operations. Topics: comparative instruction set architectures, microprogramming, memory management, processor management, I/O, interrupts, and emulation of processors.
Prerequisites: Grades of at least C (2.0) in CSC 261, CSC 330, and CSC 350, or permission of instructor.

CSC 562 Principles of Operating Systems 3
Techniques and strategies used in operating system design and implementation: managing processes, input/output, memory, scheduling, file systems, and protection.
Prerequisites: Pr. grades of at least C (2.0) in CSC 261 and CSC 340 or permission of instructor.
Notes: Successful completion of CSC 561 helpful.

CSC 567 Principles of Computer Networks 3
Hardware and software components of computer networks, their organization and operations. Topics: open system interconnection; local area networks; TCP/IP internetworking, routing, and packet switching; network programming.
Prerequisites: Grades of at least C (2.0) in CSC 261 and CSC 330, or permission of instructor.

CSC 568 Principles of Wireless Networks 3
Digital communications, communication networks, wireless communication technology, wireless networking, wireless LANs, and wireless network programming.
Prerequisites: Grades of at least C (2.0) in CSC 330 and CSC 567, or permission of instructor.

CSC 580 Cryptography and Security in Computing 3
Prerequisites: Grades of at least C (2.0) in CSC 330 and one of CSC 471, CSC 561, CSC 562, or CSC 567, or permission of instructor.

CSC 581 Principles of Computer Security 3
Core concepts in computer security, including the security goals of confidentiality, integrity, and availability; authentication; access control; security software development; use of cryptography; and basic network security.
Prerequisites: Grade of C or better in CSC 261 and CSC 330, or permission of instructor.

CSC 583 Firewall Architecture and Computer Security 3
Firewall hardware and software technologies. Architectures, protocols and their applications.
Prerequisites: Grades of at least C (2.0) in CSC 567 and CSC 580, or permission of instructor.

CSC 594 Directed Study in Computer Science 1-3
Directed study in Computer Science
Notes: Grade: Pass/Not Pass (P/NP).

CSC 593 Directed Study in Computer Science 1-3
Directed study in Computer Science.
Notes: Grade: Pass/Not Pass (P/NP).

CSC 622 Advanced Digital Image Processing 3
Image restoration, segmentation, coding, representation and description, morphological transforms, object recognition.
Prerequisites: CSC 522 or permission of instructor.

CSC 624 Artificial Intelligence 3
Logical foundations, knowledge representation and reasoning, search, and selected topics such as natural language processing and reasoning under uncertainty.
Prerequisites: Grade of at least C (2.0) in CSC 330 and one of CSC 471, CSC 561, CSC 562, or CSC 567, or permission of instructor.

CSC 561 Principles of Computer Architecture 3
Hardware and software components of computer systems, their organization and operations. Topics: comparative instruction set architectures, microprogramming, memory management, processor management, I/O, interrupts, and emulation of processors.
Prerequisites: Grades of at least C (2.0) in CSC 261, CSC 330, and CSC 350, or permission of instructor.

CSC 562 Principles of Operating Systems 3
Techniques and strategies used in operating system design and implementation: managing processes, input/output, memory, scheduling, file systems, and protection.
Prerequisites: Pr. grades of at least C (2.0) in CSC 261 and CSC 340 or permission of instructor.
Notes: Successful completion of CSC 561 helpful.

CSC 567 Principles of Computer Networks 3
Hardware and software components of computer networks, their organization and operations. Topics: open system interconnection; local area networks; TCP/IP internetworking, routing, and packet switching; network programming.
Prerequisites: Grades of at least C (2.0) in CSC 261 and CSC 330, or permission of instructor.

CSC 568 Principles of Wireless Networks 3
Digital communications, communication networks, wireless communication technology, wireless networking, wireless LANs, and wireless network programming.
Prerequisites: Grades of at least C (2.0) in CSC 330 and CSC 567, or permission of instructor.

CSC 580 Cryptography and Security in Computing 3
Prerequisites: Grades of at least C (2.0) in CSC 330 and one of CSC 471, CSC 561, CSC 562, or CSC 567, or permission of instructor.

CSC 581 Principles of Computer Security 3
Core concepts in computer security, including the security goals of confidentiality, integrity, and availability; authentication; access control; security software development; use of cryptography; and basic network security.
Prerequisites: Grade of C or better in CSC 261 and CSC 330, or permission of instructor.

CSC 583 Firewall Architecture and Computer Security 3
Firewall hardware and software technologies. Architectures, protocols and their applications.
Prerequisites: Grades of at least C (2.0) in CSC 567 and CSC 580, or permission of instructor.

CSC 594 Directed Study in Computer Science 1-3
Directed study in Computer Science
Notes: Grade: Pass/Not Pass (P/NP).

CSC 593 Directed Study in Computer Science 1-3
Directed study in Computer Science.
Notes: Grade: Pass/Not Pass (P/NP).
CSC 626 Advanced Bioinformatics 3
Advanced topics in bioinformatics related to sequence comparison and database search, fragment assembly of DNA, physical mapping of DNA, phylogenetic trees, genome rearrangements, and molecular structure prediction.

Prerequisites: CSC 526 or permission of instructor.

CSC 640 Software Engineering 3
Organization and scheduling of software engineering projects and structured software design. Specification methods, metrics, software engineering tools, design, prototyping, version control, and testing.

Prerequisites: CSC 330 or permission of instructor.

CSC 650 Language Theory 3
Important aspects of language theory. Advanced topics such as grammar, codes, L systems, and combinatorics on words.

Prerequisites: CSC 550 or permission of instructor.

CSC 653 Advanced Theory of Computation 3
Computability theory including Church-Turing thesis (Turing machines, variants, other models), decidability (decidable and undecidable problems for automata and grammars, the halting problem), reducibility (undecidability of mathematical truth).

Prerequisites: CSC 553, or permission of instructor.

CSC 655 Foundations of Computer Science 3
Introduces the mathematical foundations that support advanced studies in computer science including computer programming and the analysis of algorithms.

Prerequisites: CSC 350 or permission of instructor.

CSC 663 Advanced Topics in Computer Systems 3

Prerequisites: CSC 330 and CSC 567 or CSC 561 or CSC 562 or permission of instructor.

Notes: May be repeated for credit when topics vary.

CSC 665 Advanced Wireless Networks 3
Wireless technology and architecture, wireless network types, wireless network design approaches, wireless application development and wireless network programming.

Prerequisites: CSC 330 or equivalent and one of the following: CSC 561 or CSC 562 or permission of instructor.

CSC 671 Advanced Database Systems 3

Prerequisites: CSC 330 or permission of instructor.

CSC 672 Database System Architecture 3
File organization and indexing techniques. Query processing and optimization. Concurrency control and crash recovery. Distributed and heterogeneous database systems. Selected topics of current interest in database and knowledge-base systems.

Prerequisites: CSC 570 or CSC 671, or permission of instructor.