

COMPUTER SCIENCE AND INFORMATICS

Computer Science

Mission

The mission of the Computer Science Department is to provide a transformational educational experience in a Christian context through personalized mentoring and instruction, advanced scholarship, professional practice, and service that prepares our graduates for lifelong learning and ethically responsible leadership in the field.

Programs

The Department of Computer Science offers a Bachelor of Science in Computer Science (B.S.C.S.) degree, a Bachelor of Arts (B.A.) degree with a major in Computer Science, a Bachelor of Science in Informatics (B.S.I.) degree with majors in Bioinformatics and Data Science, and a Bachelor of Science in Computing with a major in Computer Science Fellows (B.S.C.).

The **Bachelor of Science in Computer Science (B.S.C.S.)** degree is designed for students who desire a significant concentration in upper-level computer science topics and a solid foundation in mathematics and the sciences. The B.S.C.S. program is accredited by the Computing Accreditation Commission of the Accreditation Board for Engineering and Technology. Students select one of three areas of concentration in order to meet their career goals: computer science, software engineering, or cybersecurity. All concentrations include a common set of core topics in computing, preparing graduates to pursue careers in research, industry, or other computing-related fields. A graduate degree in computer science is recommended for those pursuing a research career.

The **Computer Science Concentration** focuses on providing a broad survey of topics in computing. It allows a wide range of options in advanced elective topics. This concentration provides a strong foundation for applying computing to a wide-range of areas.

The **Software Engineering Concentration** emphasizes the methods used to produce and maintain high-quality software in a systematic, controlled, and efficient manner. It combines computer science with topics more closely associated with engineering, such as quality assurance, project planning, and economic tradeoffs. In addition to Software Engineering I and II, which are required of all B.S.C.S. students, the concentration includes courses in software quality assurance, software project management, and engineering economics.

The **Cybersecurity Concentration** provides exposure to concepts, tools, and processes related to cybersecurity threats, vulnerabilities, and defensive mitigations. It combines computer science foundational coursework with both theoretical work and applied (e.g., laboratory) experiences that will ground students in the concepts, techniques, tactics, and procedures used to compromise and secure computer systems. The concentration includes courses in Introduction to Cybersecurity, Advanced Cybersecurity, Cryptology, Terrorism, and Cybersecurity Lab. Upon graduation, students will be prepared for a career in the cybersecurity industry.

The **Bachelor of Arts (B.A.)** degree with a major in computer science provides a traditional liberal arts education with a solid set of core courses in computer science. These courses provide the foundation necessary for a career in computer science. During the sophomore year, a student selects one of two areas of concentration in order to meet

specific goals. Students may choose a concentration program from computer science, or any approved minor in another discipline. The requirements for the B.A. with a major in computer science are presented in the College of Arts & Sciences section of this catalog.

The **Bachelor of Science in Informatics (B.S.I.)** degree offers majors in Bioinformatics and Data Science. The **Bioinformatics** major is a multidisciplinary program offered by the Department of Computer Science in conjunction with the Biology Department. The uniqueness of the program is the strong foundation it provides in both disciplines. Graduates may pursue careers in either computer science or biology, or in bioinformatics, a field that combines the two. The curriculum includes courses in biology, computer science, chemistry, and mathematics, as well as the humanities and social sciences. It is an excellent choice for students planning to enter one of the medical professions.

The major in **Data Science** is designed for individuals interested in interdisciplinary approach to data management and analysis in the digital age. The curriculum provides a strong foundation in programming, statistics, mathematics, and computing, with particular emphasis in cloud computing, machine learning and data mining. A major in Data Science also requires students to obtain a minor in a second discipline. Upon graduation, students with this major will be ready for careers in the emerging fields of Data Science, Data Analytics, and Data Management.

The **Bachelor of Science in Computing with a Major in Computer Science Fellows (CSF)** The Computer Science Fellows Program is designed for highly motivated students entering the School of Engineering & Computer Science with a wide range of interests who desire a more diverse experience across the disciplines. The program seeks to broaden Computer Science Fellows' backgrounds in their chosen area(s) of diversification while preparing them for graduate studies or for successful careers. The Computer Science Fellows is a major within the School of Engineering & Computer Science that allows Fellows to create an individualized course of study with the advice of a program Director who mentors them throughout the entire undergraduate experience. In the course of this mentoring process, the Director will in turn call upon the expertise of professors in other departments for assistance in serving the needs of the Fellow.

An important characteristic of the Baylor computer science programs is the integration of software, hardware, theory, and design methodology throughout the curriculum. A highly personalized education is provided by faculty dedicated to undergraduate education with small class sizes and modern laboratories. The programs are broadly based to prepare computer science graduates to handle the increasingly complex and ever-changing areas of computer science and bioinformatics.

- Computer Science (B.S.C.S.) (<https://catalog.baylor.edu/undergraduate/school-engineering-computer-science/computer-science-bscs-informatics-bsi/bachelor-science-computer-science-bscs/>)
- Bioinformatics, B.S.I. (<https://catalog.baylor.edu/undergraduate/school-engineering-computer-science/computer-science-bscs-informatics-bsi/bioinformatics-bsi/>)
- Data Science, B.S.I. (<https://catalog.baylor.edu/undergraduate/school-engineering-computer-science/computer-science-bscs-informatics-bsi/data-science-bsi/>)
- Computer Science Fellows, B.S.C. (<https://catalog.baylor.edu/undergraduate/school-engineering-computer-science/computer-science-bscs-informatics-bsi/computer-science-fellows-csf-bsc/>)

- Computer Science, B.A. (<https://catalog.baylor.edu/undergraduate/school-engineering-computer-science/computer-science-bscs-informatics-bsi/computer-science-ba/>)

Computer Science (CSI)

BINF 1095 Bioinformatics First-year Seminar (0)

Pre-requisite(s): Restricted to Bioinformatics majors

The Bioinformatics First-Year Seminar is designed to assist new students in making a successful transition from learning in high school (or from another college) to learning at Baylor. Students are guided to accept responsibility for their learning and to understand practices and values that will impact their undergraduate experience; to further instill practicing values that will lead to academic success; and to connect with other new students and faculty members in the department and across campus for the main purpose of helping them be successful in the department of Computer Science, Baylor, and beyond.

BINF 3350 Genomics and Bioinformatics (3)

Cross-listed as BIO 3350

Pre-requisite(s): BIO 2306

The overall objective of this course is to familiarize students with concepts in genomics, proteomics, systems biology and bioinformatics. Upon course completion students will be able to properly identify appropriate software for use in solving biologically relevant questions. Individuals will also be able to use software efficiently to address questions and maintain a reasonable web presence.

BINF 3360 Introduction to Computational Biology (3)

Pre-requisite(s): BINF 3350 and CSI 3344

An introduction to the computable issues in biology. Assignments will focus on gaining competency in the use of bioinformatics applications, algorithm design, Perl programming, protein structure modeling, and genome annotation.

BINF 3V96 Bioinformatics Internship Experience (1-3)

Pre-requisite(s): BINF 3350 and 3360; Consent of instructor

Department arranged/approved summer intern work experience in bioinformatics-related position. Includes a minimum of eight weeks of employment.

BINF 43C9 Bioinformatics Senior Capstone Project (3)

Pre-requisite(s): Senior standing

Minimum grade of C in both CSI 3335 and BINF 3360. A semester-long project course in which students will create a bioinformatics computing system. The project requires applying information technology according to established design management practices, including technical presentations (oral and written) by all students.

CSF 3001 Independent Reading Survey (0)

Co-requisite(s): CSF 3102

Exit survey taken at the end of two semesters of junior readings and research to summarize a student's independent readings and research, and to ascertain readiness for the senior thesis.

CSF 3101 Advanced Readings and Research I (1)

A one-credit-hour course that is designed to facilitate the beginning phase of the CS Fellows thesis project. The course is conducted under the direction of the director of the CS Fellows program and a faculty research advisor from the student's department, concentration area, or area of research.

CSF 3102 Advanced Readings and Research II (1)

Pre-requisite(s): CSF 3101 or concurrent enrollment

Continuation of CSF 3101. Continued exploration in the Fellow's research field through advanced readings and/or laboratory or field-work procedures, research, writing, and conversations with professors. Includes submission of a formal thesis proposal.

CSF 4001 Senior Exit Survey (0)

Co-requisite(s): CSF 4302

Pre-requisite(s): Completion of CSF 3102 and CSF 3001, and approval of the CS Fellows Director

Required during the final undergraduate semester for all Computer Science Fellows. Ensures that all CS Fellows requirements have been satisfied.

CSF 4302 Fellows Thesis (3)

Co-requisite(s): CSF 4001

Pre-requisite(s): CSF 4V01 and approval of the CS Fellows Director

Thesis with final deliverables that include a complete research paper, any client-specific documentation, and a functional prototype.

CSF 4V01 Research/Fellows Thesis I (1-3)

Pre-requisite(s): Completion of CSF 3102 and CSF 3001, and approval of CS Fellows Director

Fellows will work with their Research Advisor to determine the scope of work required for their research/thesis. Culmination of this course is the submission of the outline, first chapter, and bibliography to the Research Advisor and CS Fellows Director.

CSI 1095 Computer Science First-year Seminar (0)

Pre-requisite(s): Restricted to Computer Science majors The CS First-Year Seminar is designed to assist new students in making a successful transition from learning in high school (or from another college) to learning at Baylor

Students are guided to accept responsibility for their learning and to understand practices and values that will impact their undergraduate experience; to further instill practicing values that will lead to academic success; and to connect with other new students and faculty members in the department and across campus for the main purpose of helping them be successful in the department of Computer Science, Baylor, and beyond.

CSI 1130 Introduction to Python for non-majors (1)

Introduction to programming using the python language. Topics covered include basic data types, writing programs using sequence, branch and loop and using functions from advanced libraries. This course assumes no prior programming experience and does not count towards the computer science degree.

CSI 1337 Introduction to Video Game Design (3)

This course will introduce students to the theory and application of video game design. Students will work in teams to create video games in a game development engine. The students will also learn theory behind good game design, including the use of game rules to enhance gameplay, the creation of virtual worlds, and the use of games as a social experience. No prior programming experience is required.

CSI 1401 Introduction to Programming I (4)

An introduction to computer science for non-majors, emphasizing computational thinking, problem-solving, small-scale programming, and applications. This includes basic programming constructs such as data, variables, functions, conditionals, loops, lists, files, sets, dictionaries, object-oriented programming, and problem solving. Applications will include image processing, numerical computing, and graphics.

CSI 1402 Introduction to Programming II (4)

Pre-requisite(s): C or better in CSI 1401 or CSI 1430 An advanced introduction to computer science for non-majors emphasizing problem-solving, computational thinking, small-scale programming and applications

This includes more advanced programming concepts such as data structures, class objects, object oriented programming and algorithm analysis.

CSI 1430 Introduction to Computer Science I with Laboratory (4)

Introduction to computers, problem solving and algorithm development. Design, code, debug and document programs using techniques of good programming style and C++ programming language. Laboratory experiments and examples will be used to illustrate and reinforce concepts taught in the lectures.

CSI 1440 Introduction to Computer Science II with Laboratory (4)

Pre-requisite(s): CSI 1430 with a grade of C or better
Continuation of CSI 1430. Introduction to basic aspects of arrays, pointers, classes, inheritance, polymorphism, virtual functions, linked lists, stacks, queues, and binary trees.

CSI 1V90 Special Topics in Freshman Computer Science (1-4)

For undergraduates who wish to study introductory topics not available in formal courses within the major. Course may be repeated with a change in content or topic.

CSI 2300 Introduction to Data Science (3)

Cross-listed as STA 2300

Principles of data science, including problem workflow, variable types, visualization, modeling, programming, data management and cleaning, reproducibility, and big data.

CSI 2334 Introduction to Computer Systems (3)

Pre-requisite(s): Minimum grade of B in CSI 1440; Minimum grade of C in CSI 2350 or concurrent enrollment

An introduction to the structure of computer systems and the relationship between software and hardware. Topics include computer organization and representation of information in a computer. An assembly language will be used for programming assignments to illustrate the relationship between high-level languages and machine operations and interpretation of software.

CSI 2350 Discrete Structures (3)

Pre-requisite(s): Minimum grade of B in CSI 1440 or concurrent enrollment OR minimum grade of C in CSI 1402 or concurrent enrollment; MTH 1321 or concurrent enrollment

An introduction to the foundations of discrete structures as they apply to computer science, focusing on providing a solid theoretical foundation for further work. Topics include sets, ordered structures, graph and trees, functions, proof techniques, number systems, logic, Boolean algebra, etc.

CSI 3101 Computers in Society (1)

Pre-requisite(s): A CSI or BINF major with at least junior-level standing; or consent of instructor

Study of computer ethics, risks, privacy, ownership of software, responsibility and liability, computer crime, and professional codes of conduct as they relate to society.

CSI 3303 Information Technology (3)

Topics covered will include hardware and software systems, social and ethical issues, information search strategies for research, and personal and organizational security issues (not applicable to a major in computer science).

CSI 3324 Numerical Methods (3)

Cross-listed as MTH 3324

Pre-requisite(s): Minimum grade of C in both CSI 1430 and MTH 1321
Numerical differentiation and integration, linear systems of equations, numerical solutions of ordinary differential equations, curve fitting, and computational techniques.

CSI 3334 Data Structures (3)

Pre-requisite(s): CSI 1440 with a grade of B or better; and CSI 2350 with a grade of C or better

Software design and construction with abstract data types. Description, performance and use of commonly-used algorithms and data structures including lists, trees, and graphs.

CSI 3335 Database Design and Applications (3)

Cross-listed as DSC 3335

Pre-requisite(s): CSI 3344 with a grade of C or better or CSI 1402 with a grade of C or better

Current relational database design concepts including ER diagrams and normalization. Database access techniques such as SQL and JDBC. Database issues including performance and security. Web-database applications.

CSI 3336 Systems Programming (3)

Pre-requisite(s): CSI 2334 and 3344 with a grade of C or better

The organization and structure of computer systems, basic concepts of an operating system, command line interpreter, script programming, and system calls. Programming projects in Unix and C programming language.

CSI 3338 Computer Organization (3)

Cross-listed as ELC 3338

See ELC 3338 for course information.

CSI 3342 Principles of Software Design (3)

Pre-requisite(s): CSI 3335

An introduction to object-oriented analysis and design. Iterative development; identification of requirements; software development process; UML notation, models and methods; and introduction to design patterns. Software project using an object-oriented language.

CSI 3344 Introduction to Algorithms (3)

Pre-requisite(s): Minimum grade of C in CSI 3334

This course will provide a comprehensive introduction to computer algorithms taken from diverse areas of application. This course will concentrate on algorithms of fundamental importance and on analyzing the efficiency of these algorithms.

CSI 3371 Software Engineering I (3)

Co-requisite(s): CSI 3130

Pre-requisite(s): CSI 3334

Fundamentals of Software Engineering; software development processes, requirements analysis, modular design and implementation of software systems, software testing and evolution. A small project to illustrate and extend concepts from lectures.

CSI 3372 Software Engineering II (3)

Pre-requisite(s): CSI 3344 and CSI 3471 with a grade of C or better

An engineering approach to software development emphasizing design patterns and techniques for enterprise application development. Completing software project applying development process.

CSI 3373 Software Quality Assurance and Testing (3)

Pre-requisite(s): Minimum grade of C in CSI 3471

Quality, how to assure it and how to verify that it exists; the need for a culture of quality; how to avoid errors; inspections and reviews; verification versus validation; testing, verification, and validation techniques; process assurance and product assurance; quality process standards; faults; problem analysis and reporting; and statistical approaches to quality control.

CSI 3374 Software Project Management (3)

Pre-requisite(s): Minimum grade of C in CSI 3471 or minimum grade of C in DSC 4310

Project planning, cost estimation, and scheduling; project management tools; factors influencing productivity and success; productivity metrics; analysis of options and risks; planning for change; management of expectations; release and configuration management; software process standards and process implementation; and software contracts and intellectual property.

CSI 3439 Computer Architecture (4)

Pre-requisite(s): CSI 2334 with a grade of C or better

Continued study of computer organization, focusing on hardware structure and implementation. Topics include digital logic CPU organization and microprogramming, memory organization, and input/output structures.

CSI 3471 Software Engineering I (4)

Pre-requisite(s): A minimum grade of C in CSI 3344 or concurrent enrollment; and a minimum grade of C in CSI 3334

Introduction to UML notation; constructing and interpreting use cases; interpreting UML models; introduction to design patterns; introduction to testing; introduction to configuration management; Java as a second language; and implementing a graphical user interface. Laboratory assignments and a small project illustrate and extend concepts from lectures.

CSI 3V90 Special Topics in Intermediate Computer Science (1-4)

Pre-requisite(s): Instructor approval required

For undergraduates who wish to study intermediate topics not available in formal courses within the major. Course may be repeated with a change in content or topic.

CSI 3V95 Internship Experience (1-3)

Pre-requisite(s): Computer Science major; consent of instructor
Department arranged/approved summer intern work experience in computer science-related position. Includes a minimum of eight weeks of employment.

CSI 4010 Undergraduate Research Seminar (0)

Pre-requisite(s): Consent of instructor

Introduction of computer science research opportunities to interested computer science undergraduates.

CSI 4111 Cybersecurity Laboratory (1)

Pre-requisite(s): Minimum grade of C in CSI 3334 or concurrent enrollment

This is a laboratory course that will emphasize both offensive and defensive security techniques in an applied laboratory environment. The course may be taken 3 times to earn an upper division elective.

CSI 4144 Competitive Learning (1)

Pre-requisite(s): CSI 3334 and consent of instructor

Students in the course will learn and implement algorithms to solve programming challenges. Topics include graph algorithms, backtracking search, simulation, geometry, combinatorics, number theory, sorting, searching, parsing, and output formatting. The course may be taken up to 3 times for credit.

CSI 4301 Cultural Impact of the Computer (3)

Pre-requisite(s): Upper-level standing

Issues related to the creation and use of computer technology, considered within the broader context of technology and culture. Includes all topics from CSI 3101 as a subset.

CSI 4321 Data Communications (3)

Pre-requisite(s): Minimum grade of C in CSI 3336

Fundamentals of computer networking including data transmission, communication software, protocols, simple networks and internetworking.

CSI 4322 Numerical Analysis (3)

Cross-listed as MTH 4322

See MTH 4322 for course information.

CSI 4323 Introduction to Cybersecurity (3)

Pre-requisite(s): Minimum grade of C in CSI 3471

Minimum grade of C in CSI 3335 and CSI 4321 or concurrent enrollment. This course provides an overview of cybersecurity threats, vulnerabilities, and defensive mitigations. The course will emphasize both theoretical concepts and practical application with critical thinking. Example topics include: authentication, access control, malware, intrusion, firewalls, encryption, software security, auditing/monitoring, and risk management.

CSI 4325 Advanced Cybersecurity (3)

Pre-requisite(s): Minimum grade of C in CSI 4321 and CSI 4323

This course provides additional depth and application of the cybersecurity concepts introduced in CSI 4323 (Introduction to Cybersecurity). Example topics include: penetration testing, cyber resilience, trusted computing, reverse engineering, network situational awareness, security architecture, incident handling, threat intelligence, and forensics.

CSI 4328 Numerical Linear Algebra (3)

Cross-listed as MTH 4328

See MTH 4328 for course information.

CSI 4330 Foundations of Computing (3)

Pre-requisite(s): CSI 3344 with a grade of C or better

Theoretical concepts that form the basis of computer science, including regular languages, context-free languages, Turing-decidable languages, nondeterminism, parsing, NP_Completeness, and undecidability.

CSI 4335 Database Design I (3)

Pre-requisite(s): CSI 3342

Concepts for current relational database design and implementation, including SQL, ER diagrams, normalization, JDBC, XML and DBMS components. Semester project designing a relational database.

CSI 4336 Introduction to Computation Theory (3)

Pre-requisite(s): CSI 3344 with a grade of C or better

Several models of computation and their related languages. Topics will include finite automata and regular languages, push-down automata and context-free languages, linear-bounded automata and context-sensitive languages. Turing machines and phrase structure languages, closure properties, decidability results, non-determinism.

CSI 4337 Introduction to Operating Systems (3)

Pre-requisite(s): C or better in CSI 3336

Operating system design and implementation. Topics include process control and synchronization, memory management, processor scheduling, file systems, and security. Course projects implement parts of an operating system.

CSI 4341 Computer Graphics (3)

Pre-requisite(s): C or better in CSI 3334 and MTH 2311 or 2321

Introduction to graphic representation and display of information and objects by computer. Topics include hardware display technology and algorithms for two-dimensional and three-dimensional graphics. A current graphic system model will be used for programming assignments.

CSI 4342 Gaming Platform Frameworks (3)

Pre-requisite(s): CSI 4341 with a grade of C or better

Game Framework Design and Development. An introduction to game development platforms. Topics include: Game design principles, project management, game-related algorithms/mathematics, game physics, game audio/video, AI, development tools, and real-time systems.

CSI 4344 Object-Oriented Development (3)

Pre-requisite(s): CSI 3342

Object-oriented analysis and design methods. Group software projects.

CSI 4352 Introduction to Data Mining (3)

Pre-requisite(s): Minimum grade of C in CSI 3335, Minimum grade of C in CSI 3344

Introduction to the concepts, techniques, and applications of data warehousing and data mining. Topics include design and implementation of data warehouse and OLAP operations; data mining concepts and methods such as association rule mining, pattern mining, classification, and clustering; applications of data mining techniques to complex types of data in various fields.

CSI 43C8 Gaming Capstone Design Project (3)

Pre-requisite(s): Minimum grade of C in CSI 3372, Minimum grade of C in CSI 4321, Minimum grade of C in CSI 4337, Minimum grade of C in CSI 4342, and senior standing

A semester long project course in which students will create a gaming system. The project requires applying information technology according to established design management practices, including technical presentations (oral and written) by all students.

CSI 43C9 Capstone Design Project (3)

Pre-requisite(s): Senior standing and Minimum grade of C in CSI 3335, Minimum grade of C in CSI 3372, Minimum grade of C in CSI 4321, and Minimum grade of C in CSI 4337

A semester-long project course in which students will create a computing system. The project requires applying information technology according to established design management practices, including technical presentations (oral and written) by all students.

CSI 4V96 Special Topics in Computer Science (1-9)

Pre-requisite(s): Consent of instructor is required

DSC 2334 Computing and Computer Fundamentals (3)

Pre-requisite(s): C or better in CSI 1402 or CSI 1440; C or better in DSC 2350 or CSI 2350 or concurrent enrollment

An introduction to the structure of computer systems and the relationship between software and hardware. Topics include computer organization and representation of information in a computer. Programming assignments will be used to illustrate the digital representation of data, the fundamental tasks associated with an operating system, network communications, etc.

DSC 2350 Discrete Structures for Data Science (3)

Pre-requisite(s): C or better in CSI 1402 or concurrent enrollment; MTH 1321 or concurrent enrollment

An introduction to the foundations of discrete structures as they apply to data science, focusing on providing a solid theoretical foundation for further work. Topics include sets, ordered structures, graph and trees, functions, proof techniques, number systems, logic, Boolean algebra, etc.

DSC 3310 Cloud Computing (3)

Pre-requisite(s): C or better in DSC 3335

This cloud computing course focuses on practical hands-on experience with modern cloud computing ecosystems. It features content based on active engagement with public cloud services and real-world experiences. Students will be introduced to contemporary coding paradigms designed for horizontally scalable computing environments.

DSC 3334 Algorithms and Data Structures (3)

Pre-requisite(s): C or better in CSI 1402

Analysis of the use of appropriate data structures to hold and process large amounts of data. Application of the data structures using data science and machine learning algorithms and discussion of the algorithms' runtimes.

DSC 3335 Database Design & Application (3)

Cross-listed as CSI 3335

See CSI 3335 for course information.

DSC 3344 Analytics for Machine Learning (3)

Pre-requisite(s): C or better in DSC 3334

An introduction to the data analytics used in machine learning, including descriptive statistics, probability and counting theory, samples and probability distributions, inferential statistics, linear regression, principal component analysis, and non-parametric analysis. Ethics in data analytics are also discussed.

DSC 4310 Machine Learning (3)

Pre-requisite(s): C or better in DSC 3335 and 3344

This course provides an introduction to the fundamental methods and theory of modern machine learning. Machine learning algorithms covered include: shallow, mid-level, and deep learning models and their applications as well as unsupervised learning and reinforce learning techniques.

DSC 4320 Data Visualization (3)

Pre-requisite(s): CSI 2300

Investigation of the various techniques for creating effective visualizations, incorporating principles of graphic design, cognitive and perceptual psychology, data analysis, and human factors evaluations. Using the growing toolbox for visual description and presentation, students apply visualization techniques and build novel visualization tools for solving complex problems.

DSC 4354 Cybersecurity for Data Science (3)

Pre-requisite(s): C or better in DSC 3310 or concurrent enrollment; C or better in DSC 3344 or concurrent enrollment

Provides an overview of cybersecurity threats, vulnerabilities, and defensive mitigations. The course emphasizes both theoretical concepts and practical application with critical thinking. Example topics include: authentication, access control, malware, intrusion, firewalls, database and cloud security, auditing/monitoring, and risk management.

DSC 43C8 Big Data (3)

Pre-requisite(s): C or better in DSC 3310; C or better in DSC 4310; C or better in DSC 4320

This course investigates how the data parallel paradigm can be extended to the distributed case, using modern big data tools. Parallel programming models will be investigated in detail. Key issues related to distribution, like latency and network communication will be considered and how they can be addressed effectively for improved performance.

DSC 43C9 Data Science Capstone (3)

Pre-requisite(s): C or better in DSC 43C8

A semester-long project course in which students will create a computing system. The project requires applying information technology according to established design management practices, including technical presentations (oral and written) by all students.

DSC 4V96 Special Topics in Data Science (1-3)

Pre-requisite(s): Consent of department chair

Study of advanced topics in data science.