COMPUTER SCIENCE, MINOR

Why Take This Minor?

Students who pursue Computer Science enjoy programming (writing code) and the software side of computing. Graduates pursue careers as software developers, computer analysts, systems engineers, and web developers. The minor in computer science introduces students to the foundational courses in the field usually encountered during the first two years of study, and then students take two upper-level electives.

Required for Graduation

- Courses
  - 6
- Credits
  - 20-21

Requirements

Code	Title	Credits
Take two of these 3: 220, 230, 240		6 or 7
CSIT 220	Data Communication	
CSC 230	Programming Concepts and User Interfaces	
CSC 240	Database Management Systems	
CSC 280	Object Programming	4
CSC 290	Introduction to Data Structures and Algorithms	4
Two CSC electives, 300-level or higher		6
Total Hours		20 or 21

Choices for CSC Elective

Code	Title	Credits
CSC 301	Computer Architecture	3
CSC 340	.Net Programming	3
CSC 341	Open-Source Application Development	3
CSC 343	Client-Side Scripting	3
CSC 349	Mobile Computing	3
CSC 366	Language Theory and Design	3
CSC 370	Selected Topics in Computer Science	3-4
CSC 381	Software Engineering	3
CSC 444	Research in CSC I	1-3
CSC 446	Data Mining	3
CSC 456	Artificial Intelligence	3
CSC 457	Operating Systems	3
CSC 464	Theory of Algorithms	3
CSC 470	Selected Topics in Computer Science	3
CSC 481	Project Implementation	3

Recommended Course Sequence

Course	Title	Credits
Third Year		
First Semester		
CSC 230	Programming Concepts and User Interfaces	4
Either CSC 240 or CSIT 220		3
	Credits	7
Second Semester		
CSC 280	Object Programming	4
	Credits	4
Fourth Year		
First Semester		
CSC 290	Introduction to Data Structures and Algorithms	4
CSC 300+ elective		3
	Credits	7
Second Semester		
CSC 300+ elective		3
	Credits	3
	Total Credits	21

Course Descriptions

CSC 230 Programming Concepts and User Interfaces
This course addresses problem solving and programming using problem-based learning; variables, control flow, iteration, modules, arrays, file processing, classes, and objects; and basic graphical-user interface concepts (forms/pages and controls) for desktop and/or Web or mobile environments. The course consists of three hours of lecture and three hours of laboratory per week. Prerequisite(s): MTH 101 or Math Placement Score 102M Corequisite(s): CSL 230

CSC 240 Database Management Systems
This course includes components of database systems, database models: entity-relationship, relational, hierarchical, network; normalization, integrity, relational algebra, query languages, system security, distributed databases, and social and ethical concerns. In addition, case studies using a relational DBMS will be implemented.

CSC 280 Object Programming
This course involves problem solving using a high-level object-oriented language, such as Java; analyzing problems, designing a solution, implementing a solution, testing, and debugging; abstraction, encapsulation, and inheritance; using, designing, creating, and testing classes; and selection, iteration, and simple collections, such as arrays. The course consists of three hours of lecture and three hours of laboratory per week. Prerequisite(s): CSC 230. Corequisite(s): CSL 280

CSC 290 Introduction to Data Structures and Algorithms
This course is a continuation of CSC 280. It focuses on abstract data types, including lists, stacks, queues, binary trees, and hash tables; recursive techniques; iterators; and use of classes in the Java Collections Framework for problem solving. The course consists of three hours of lecture and three hours of laboratory per week. Prerequisite(s): CSC 280 Corequisite(s): CSL 290

CSC 301 Computer Architecture
This course is an introduction to computer architecture and hardware; underlying structures needed to accomplish tasks electronically; and hardware and software architecture components relative to memory management, I/O control, and processing capabilities. Prerequisite(s): CSIT 220

CSC 340 .Net Programming
This course focuses on programming in .NET (such as Visual Basic.NET or C#) and Active Server Pages (ASP.NET) that supports work with databases and the Web; models that support database access, such as MS SQL, Entity Framework, and LINQ; design and development of solutions to problems using database tools and programming; and database-driven Web sites, including validation, navigation, and security. (offered in alternate years) Prerequisite(s): CSC 230 and CSC 240

CSC 341 Open-Source Application Development
Students will develop Web solutions that integrate client- and server-side interfaces. The emphasis for the course will be on development for server side, with results being viewed and designed for the client. At least half of the course will include database maintenance using the open-source solution, including development of authentication and authorization. (offered in alternate years) Prerequisite(s): CSC 230 and CSC 240

CSC 343 Client-Side Scripting
This course will require students to design and develop standards-based client interfaces for Web/client-side applications using the latest versions of HTML, CSS, and Javascript. Students will study Web-based standards and application/design styles. Students will also use popular Web-development tools. Some mobile development will be included in the course. (offered in alternate years) Prerequisite(s): CSC 230

CSC 349 Mobile Computing
This course covers software mobile application development, its architecture and lifecycle as well as its inherent design considerations. Students will learn about mobile resources, activities, views, layouts, and intents in addition to interacting with the location-based services, messaging services, multimedia interfaces, and sensors available on the mobile device. The applications developed will manage data input from and output to files, databases, and content providers. After developing applications in an emulation environment, students will install them on individual mobile devices as well as prepare them for marketplace distribution. (offered in alternate years) Prerequisite(s): CSC 280

CSC 366 Language Theory and Design
This course involves programming languages; historical perspective and underlying serial computation model; theory: finite automata, Backus-Naur Form, representations, and grammars; and design: syntax, semantics, run-time implementation, and application domains. Language paradigms will include procedural, functional, logical, object-oriented, and non-sequential processing. (offered in alternate years) Prerequisite(s): CSC 290 and MTH 261

CSC 370 Selected Topics in Computer Science
This course is an introduction to specialized areas of computer science. The topics will vary from term to term. Prerequisite(s): junior or senior standing

CSC 381 Software Engineering
The intent of this course is to focus on basic concepts and major issues of project design using a software engineering approach; the software development life cycle; structured analysis and object-oriented design techniques; and modeling, project planning, requirements definition, and requirements testing. Prerequisite(s): CSC 290

CSC 446 Data Mining
This course introduces data mining, with an emphasis on applying machine learning techniques for data mining; popular methods, such as learning of decision trees, decision tables, rules, and cases; algorithms and applicability; practical applications; data preparation and evaluation of results, including human role in data mining; and ethical issues. (offered in alternate years) Prerequisite(s): CSC 280

CSC 456 Artificial Intelligence
Intelligent systems technologies that have or may become practical for organizational use will be addressed in this course. Topics may include simple expert systems and expert systems with certainty factors, case-based reasoning, machine learning, neural networks, genetic algorithms, fuzzy logic, and two-person game playing. (offered in alternate years) Prerequisite(s): CSC 230 and MTH 260

CSC 457 Operating Systems
Principles and concepts of process and resource management in operating systems will be the focus of this course. I/O programming; interrupt mechanism and memory management; processor management; scheduler; priority queues; traffic controller; device management; and information management and file systems are select topics. (offered in alternate years) Prerequisite(s): CSC 290

CSC 460 Internship
Internships offer part-time, paid, or non-paid employment in a cooperating site to provide practical experience in the discipline. Working under professional supervision for at least 20 hours per week, students learn how to apply their education to the everyday demands of the world of work. Students will meet regularly with a faculty member and will be encouraged to reflect on the relationship between coursework and their internship experience. Prerequisite(s): junior or senior standing, 2.5 GPA overall and in the major, and departmental approval

CSC 464 Theory of Algorithms
Students will engage in problem-solving strategies, including divide and conquer, greedy, backtracking, and dynamic programming; will focus on the complexity analysis of algorithms; and will be introduced to complexity classes P and NP, with strategies for NP-complete problems. (offered in alternate years) Prerequisite(s): CSC 290 and MTH 261

CSC 470 Selected Topics in Computer Science
This course provides an introduction to specialized research in computers and computing, concentrating on one particular aspect of computer science. The subject matter will vary from term to term. Prerequisite(s): junior or senior standing

CSC 481 Project Implementation
This course addresses implementation issues, programming language features, validation and verification techniques, and software maintenance. It requires a team project to develop, document, test, and maintain a software system. Prerequisite(s): CSC 381

Information Technology

CSIT 220 Data Communication
This course will address current methods and practices in the use of computer networks to enable communication; physical layers, architectural layers, design, operation, management, and the ISO standards. Local, cloud and wide area networks are examined. Student projects may include introductory LAN design, implementation and administration.