COMPUTER SCIENCE (CSCN)

CSCN 110 Introduction to Computer Sciences 3 Credit Hour(s)
Prerequisite: MATH 121 (may be taken concurrently) or MATH 122 (may be taken concurrently) or MATH 125 (may be taken concurrently) or MATH 126 (may be taken concurrently) or MATH 128 (may be taken concurrently) or MATH 131 (may be taken concurrently) or MATH 132 (may be taken concurrently) or MATH 133 (may be taken concurrently) or MATH 200 (may be taken concurrently) or MATH 201 (may be taken concurrently) or BUSI 230 or MATH 217 (may be taken concurrently) or MATH 227 (may be taken concurrently) or MATH 250 (may be taken concurrently) or ACT Math with a score of 25 or (pre2016 post1995)SAT Math with a score of 570 or SAT Section Math with a score of 590 or Assessment - Mathematics II with a score of 15 or Placement Score-Math with a score of 075
A breadth-first introduction to the computing disciplines, with an emphasis on computer ethics and how computing technology impacts the world. Topics include: computing history; discrete mathematics; computer architecture and organization; algorithm design; languages; compilers; operating systems; applications; networks; databases; intellectual property; privacy; free speech; social consequences; computer crime; and codes of conduct.
Offered: Resident

CSCN 111 Programming In C++ Beginner 3 Credit Hour(s)
Prerequisite: ((ENGR 110 and ENGR 133) or CSCN 110 (may be taken concurrently) or CSIS 110 (may be taken concurrently))
This class will introduce you to C++, algorithms, structured and object-oriented programming, and software engineering. The class will cover the flow of control, input/output, functions, classes, and objects. Software engineering will include problem-solving approaches, incremental development, and testing. Programming assignments are required.
Offered: Resident

CSCN 112 Programming in C++ Advanced 3 Credit Hour(s)
Prerequisite: CSCN 111 or CSIS 111
This class builds upon the foundations of the C++ language taught in CSCN 111. Its topics include advanced examination of functions, recursion, simple data structures, various sort/search algorithms, classes, objects, composition, inheritance, dynamic memory allocation, vectors, virtual functions, polymorphism, pointers, class and function templates, exception handling, and operator overloading. Programming assignments in C++ are required.
Offered: Resident

CSCN 215 Data Structures and Algorithms using C++ 3 Credit Hour(s)
Prerequisite: ((CSCN 112 or CSIS 112) and MATH 250)
Introduction of algorithms and data structures used to store, access, and manipulate large quantities of data. This class will introduce common data structures used by software engineers to build applications. Structures include lists, stacks, queues, trees, graphs, files, indexes, searching (sequential, binary, hashing, etc.) and probabilistic structures. Asymptotic Analysis will be introduced as the mechanism for measuring and comparing algorithm complexity/performance. Programming exercises in C++ reinforce lessons learned.
Offered: Resident

CSCN 230 Business Data Communications and Networks 3 Credit Hour(s)
Prerequisite: MATH 121 (may be taken concurrently) or Placement Score-Math with a score of 75
Business Data Communications begins with foundational groundings in the basics of telecommunications technologies and terminology including various transmission media. It continues by exploring the basics of networking--past, present, and future. The introduction and dive into the OSI 7-Layer model and the internal 4-Layer IP model.
Offered: Resident

CSCN 299 Internship 0 Credit Hour(s)
Application procedures processed through the Career Center. Must apply semester prior to internship. (Previously BMIS/CSCI 299)
Registration Restrictions: Sophomore status, 2.00 GPA, two courses in major, declared major, not more than one CSER behind
Offered: Resident

CSCN 310 Web Programming in HTML 3 Credit Hour(s)
Prerequisite: CSIS 100 or CSIS 110 or CSCN 110
This course teaches fundamental web programming using HTML and CSS.
Offered: Resident

CSCN 315 Front-end Programming in JavaScript 3 Credit Hour(s)
Prerequisite: CSCN 310
This course teaches the concept of progressive enhancement (simple to complex) through the use of front-end programming techniques using JavaScript and jQuery.
Offered: Resident

CSCN 316 Back-end Programming in PHP 3 Credit Hour(s)
Prerequisite: CSCN 310
This course provides an introduction to the various languages and tools used in back-end programming. The fundamentals of back-end programming will be emphasized. Due to the particularly dynamic nature of Internet technologies, course content will change as appropriate.
Offered: Resident

CSCN 321 Python and R for Data Science 3 Credit Hour(s)
Prerequisite: ((CSCN 111 or CSCN 354) and (BUSI 230 or ENGR 210 or MATH 201 or MATH 211 or MATH 411))
Python and R have become invaluable to a modern data science practice. This course provides a data science-specific introduction to the Python and R languages. This introduction includes modern data analysis techniques and popular libraries encountered in this discipline related to these languages.
Registration Restrictions: Junior or Senior status
Offered: Resident

CSCN 322 Data Engineering 3 Credit Hour(s)
Prerequisite: (CSIS 325 or CSCN 326) and CSCN 321
The ability to analyze large and complex data often requires significant aggregation and pre-processing to make it acceptable for advanced analysis. This course provides an overview of current data engineering methods to aggregate, curate, and present data for analysis, including modern distributed processing systems.
Offered: Resident

CSCN 323 Data Visualization 3 Credit Hour(s)
Prerequisite: (CSCN 326 or CSIS 325) and CSCN 321
Presenting and visualizing information to support decision-making is key to maturing organizations. This course provides an overview of current data visualization techniques, tools, and dashboards.
Offered: Resident

CSCN 326 Database Design and Management 3 Credit Hour(s)
Prerequisite: CSIS 215 or CSCN 215
The abilities to design, implement, and maintain an enterprise database are beneficial skills for computer science professionals. This course involves the study of database management systems, database architecture, design, queries, applications, administration and implementation. At least half of the course involves extensive database design with ERDs, normalization, DDL and DML SQL queries, and the use of SQL advanced queries for data analysis. The remainder of the course examines concurrency management, transaction processing, query optimization, security, database recovery, distributed databases, PHP, and XML. Projects are assigned to provide hands-on experience with the SQL language, a relational database management software package, and various ETL (Extract-Transform-Load) techniques for large data sets.
Offered: Resident

CSCN 340 Information Security Concepts and Principles 3 Credit Hour(s)
This course is a survey of the fundamental concerns and issues regarding the design, development and operation of secure information systems. Topics include threat analysis, cyber resilience, network & application security, social engineering, secure systems operation, compliance, as well as policy development & implementation. Additionally, the methods used by attackers to circumvent these protections and defenses are explored.
Offered: Resident

CSCN 342 Computer Architecture 3 Credit Hour(s)
Prerequisite: CSIS 215 or CSCN 215
This course provides an in-depth review of current and historical computer architecture designs. Students learn the fundamentals of architectural elements used in processor design, arithmetic logic units, memory structures, and I/O systems. Several assembly languages are heavily emphasized as well as how data structures are natively stored in memory and used for computation.
Offered: Resident

CSCN 345 Linux Operating System 3 Credit Hour(s)
Prerequisite: BMIT 212 or CSIS 111 or CSCN 111 or CSIS 212
This course provides an introduction to the Linux operating system from a computer science perspective. Topics covered include: system overview and structure, administration, shell scripting, compilation, troubleshooting and debugging.
Offered: Resident

CSCN 352 Windows System Administration 3 Credit Hour(s)
Prerequisite: BMIS 320 or BMIT 220 or CSIS 345 or CSCN 345
Principles of Windows system administration activities, applications, operating systems, and domains; analysis of computing applications, infrastructures, architectures, firmware, hardware, disaster recovery, security, and enterprise deployment.
Offered: Resident

CSCN 354 Fundamentals of Distributed Systems 3 Credit Hour(s)
Prerequisite: CSIS 320 or CSIS 342 or CSCN 342 or BMIT 220
Using Python as the base language, this course examines the integration of systems and applications across global businesses; explores programming interfaces, data mapping and exchange, and scripting, to support the configuration, maintenance, integration, and security of systems.
Offered: Resident

CSCN 355 Network Architecture, Protocols, and Theory 3 Credit Hour(s)
Prerequisite: ((CSIS 345 or CSCN 345) and (CSIS 112 or CSCN 112))
A study of how computer networks and internets operate. Investigates networking from the level of data transmission and wiring through the level of application software that provides networking functionality including theoretical foundations; topics include: data and packet transmission, LANs and WANs, and internet concepts, including architecture, protocol layering, and application software.
Offered: Resident

CSCN 366 Advanced Communications Architectures, Protocols, and Cybersecurity 3 Credit Hour(s)
Prerequisite: CSCN 112 and CSCN 230
A study of how computer systems communicate, and the internet operates. Investigates wired and wireless networking data transmission from the physical through the application layer, including a comparison of the OSI and IP models. Investigates software and hardware networking functionality including theoretical foundations; topics include: data and packet transmission, LAN and WAN architectures, internet communications concepts, operating system architecture, protocol layering, application software inter-process communications, and socket-level programming.
Offered: Resident

CSCN 375 Human Computer Interaction 3 Credit Hour(s)
Prerequisite: BMIT 212 or CSIS 212 or CSIS 111 or CSCN 111
This course provides a study and application of the concepts, theory, and practice of effective user interface design, including user-centered design principles. Cognitive and social aspects of human interaction will be examined in conjunction with elements of technological devices. Human interaction with mobile applications, internet applications, social networking technology, cloud computing, and stand-alone applications concepts will be explored. Additional emphasis will be placed on exploring the field of design thinking.
Offered: Resident

CSCN 377 Applied Cybersecurity 3 Credit Hour(s)
Prerequisite: CSCN 112 and CSCN 230
A study of how computer systems communicate, and the internet operates. Investigates wired and wireless networking data transmission from the physical through the application layer, including a comparison of the OSI and IP models. Investigates software and hardware networking functionality including theoretical foundations; topics include: data and packet transmission, LAN and WAN architectures, internet communications concepts, operating system architecture, protocol layering, application software inter-process communications, and socket-level programming.
Offered: Resident

CSCN 408 Mobile Programming 3 Credit Hour(s)
Prerequisite: CSIS 315 or CSIS 316 or CSCN 315 or CSCN 316
This course teaches concepts of mobile programming using web languages.
Offered: Resident

CSCN 421 Applied Machine Learning 3 Credit Hour(s)
Prerequisite: CSCN 215 and CSCN 321
Learning from data has become vitally important in modern organizations. This course provides an introduction to machine learning techniques to allow organizations to leverage their data. This course examines various supervised and unsupervised learning techniques, dimensionality reductions, neural networks and deep learning and commonly used associated libraries.
Offered: Resident

CSCN 422 Artificial Intelligence 3 Credit Hour(s)
Prerequisite: ((CSCN 342 and MATH 350) or CSCN 434) and CSCN 421 and MATH 211
This course provides a broad introduction to the modern artificial intelligence field. Areas covered include modern search techniques, optimization, knowledge representation, and decision-making.
Offered: Resident

CSCN 434 Programming Language Design and Compiler Theory 3 Credit Hour(s)
Prerequisite: ((CSIS 342 or CSCN 342)) and MATH 350
This course builds upon the student's knowledge of formal languages and provides a grand tour of computation and programming language design, culminating in compiler design. Beginning by reviewing computability and formal languages, students progress to programming language design principles, and examine the steps involved in compilation and compiler construction both from a software design perspective and theoretical approach.
Offered: Resident

CSCN 435 Malware Analysis Tools and Techniques 3 Credit Hour(s)
Prerequisite: CSCN 443
This course is designed to continue expanding the knowledge of operating systems design, specifically focusing on low-level Windows operating system design as it relates to malware analysis and development. There will be additional focus on compiler specifics to reverse engineer malware for effective analysis using modern tools and techniques.
Offered: Resident

CSCN 436 Malware Analysis Tools and Techniques - Lab 1 Credit Hour(s)
Prerequisite: CSCN 443
Laboratory exercises selected to demonstrate malware analysis research, analysis, and reverse engineering concepts. Emphasis is on analysis and reverse engineering of malware for the purposes of understanding secure software engineering and cybersecurity threat response.
Note: 2 hours lab; CSCN 435 Malware Analysis Tools and Techniques taken concurrently
Offered: Resident

CSCN 437 Embedded Systems 3 Credit Hour(s)
Prerequisite: CSCN 443
This course provides the knowledge necessary for embedded software and hardware programming and the tools necessary to program, debug, deploy, and reverse engineer real-time, standalone, networked, or mobile embedded systems for microcontrollers, IoT systems, PLC for ICS technology, and mobile systems for the purposes of securing the systems using multiple methods.
Offered: Resident

CSCN 443 Operating Systems Design 3 Credit Hour(s)
Prerequisite: CSCN 342 or CSIS 342
This course provides an in-depth review of current and historical operating system designs. Students learn how operating systems have evolved over time from real-mode systems to modern virtual memory-based operating systems. This course also includes an extensive introduction to bootloaders, system calls, system libraries, relocatable code, linkers and loaders, kernel drivers, and file systems, both from a theoretical perspective and from the software design and implementation perspective.
Offered: Resident

CSCN 444 Enterprise System Architectures 3 Credit Hour(s)
Prerequisite: CSCN 342
This course provides a review of current and historical operating system designs and the evolution to enterprise class deployments of systems using modern virtualization, containerization, and cloud-based infrastructure. The course covers the evolution of operating systems and implementation architecture methods from host based real-mode systems to modern virtualized memory-based operating system infrastructure deployed at scale. This course includes an introduction to operating system architectures, both from a theoretical perspective and from the software design and implementation perspective. The course will cover IaC technologies and methods used to deploy and secure infrastructure.
Offered: Resident

CSCN 445 Applied Digital Forensics 3 Credit Hour(s)
Prerequisite: CSCN 461 and CSCN 462
The course introduces the concept of computer crimes and the need for forensics specialists. The course content will cover the skills necessary for various system forensics incident investigation and incident response methods using the fundamentals of system forensics and the appropriate processes and tools to gather, catalog, and control computer forensic evidence. The course will cover the effective application of forensic analysis skills and evidence control for the purposes of preparing cases and exploring emerging technologies as well as future directions of this field.
Offered: Resident

CSCN 461 Aspects of Computer Security-Defensive 3 Credit Hour(s)
Prerequisite: ((CSIS 352 or CSCN 352) and (CSIS 355 or CSCN 355))
This course introduces the following issues and principles of information system security: security policies and their mechanisms of implementation, methods used by attackers attempting to circumvent these protections, and specific defenses against these attackers.
Offered: Resident

CSCN 462 Advanced Aspects of Computer Security-Ethical Hacking 3 Credit Hour(s)
Prerequisite: CSCN 461 or CSIS 461
This course introduces the following issues and principles of information system security: security policies and the technical mechanisms of implementation methods used by attackers to circumvent these protections, with a focus on specific advanced technical, administrative, and physical attack tactics, techniques, and procedures.
Offered: Resident

CSCN 463 Modern Cryptography 3 Credit Hour(s)
Prerequisite: ((CSCN 215 or CSIS 215)) and MATH 350
Study of modern cryptographic techniques. Covers basic cryptographic concepts, including symmetric key, public key, hash functions, digital signatures, and message authentication codes.
Offered: Resident

CSCN 464 Applied Modern Cryptography 3 Credit Hour(s)
Prerequisite: MATH 201 and MATH 250
This course is a study of modern cryptographic techniques. The course covers the historical evolution and the current application of modern cryptographic concepts, including symmetric key, public key, hash functions, digital signatures, and message authentication codes.
Offered: Resident

CSCN 471 Software Engineering Management 3 Credit Hour(s)
Prerequisite: CSIS 215 or CSCN 215
Study of the management and performance of the software development process. Topics include: phases of a software project, life-cycle models, metrics, tools, methodologies, techniques, management, and ethical and professional issues.
Registration Restrictions: 30 credit hours of Computer Science (CSIS or CSCN) coursework and permission of the Department Chair
Offered: Resident

CSCN 481 Computer Sciences Practicum I 3 Credit Hour(s)
Prerequisite: ((CSIS 471 or CSCN 471) and (CSIS 326 or CSCN 326))
This is the application of all that the student has learned of software development and engineering. In small teams students will develop real-world applications or application products, often working with external clients and/or functional domain experts.
Registration Restrictions: Permission of Department Chair
Offered: Resident

CSCN 482 Computer Sciences Practicum II 3 Credit Hour(s)
Prerequisite: CSIS 481 or CSCN 481
This class is the follow-on to CSCN 481 and continues the application of all that the student has learned of software development and engineering. Remaining in the same teams established during CSCN 481, students will continue developing their applications and working with their clients culminating in the closeout customer briefing and the delivery of software and supporting documentation at the end of the semester.
Registration Restrictions: Permission of Department Chair
Offered: Resident

CSCN 485 Cybersecurity Practicum I 3 Credit Hour(s)
Prerequisite: ((CSIS 352 or CSCN 352) and (CSIS 355 or CSCN 355) and (CSIS 461 or CSCN 461) and (CSIS 326 or CSCN 326))
This course is a comprehensive review of the computer science cybersecurity program and integrates all concepts of software cybersecurity, from a secure software development lifecycle (SDLC) point of view.
Registration Restrictions: Permission of Department Chair
Offered: Resident

CSCN 486 Cybersecurity Practicum II 3 Credit Hour(s)
Prerequisite: ((CSIS 485 or CSCN 485)) and CSCN 462
This course is a continuation of the Cybersecurity Capstone I course and serves as the culmination of the computer science cybersecurity program which integrates all concepts of enterprise cybersecurity, from an offensive and defensive point of view.
Registration Restrictions: Permission of Department Chair
Offered: Resident

CSCN 495 Directed Research 2-3 Credit Hour(s)
Study of advanced topics in computer science on an individual basis. Periodic meetings with instructor.
Registration Restrictions: Permission of instructor
Offered: Resident

CSCN 497 Special Topics in Technology 3 Credit Hour(s)
Prerequisite: CSIS 215 or CSCN 215
Selected topics in various areas of computer science. May be repeated for credit when topic varies. (Formerly CSCI 497)
Registration Restrictions: Permission of instructor
Offered: Resident

CSCN 499 Internship 1-6 Credit Hour(s)
Applications are processed through the department Faculty Intern Advisor. Applicants must apply the semester prior to starting the internship. (Formerly CSCI 499)
Registration Restrictions: Junior Status, required GPA permission of Faculty Intern Advisor
Offered: Resident