

Course Descriptions

138. Introduction to Computer Technology (3) Introduction to graphical user interface, word processing, spreadsheet, database, Internet, cross-platform training, computer components and peripherals, input/output concepts, storage concepts, and computer buyer's guide considerations. [.](#)

139. Visual BASIC Programming I (3) Visual user interface design, event-driven programming using controls, variables, constants, calculations, decision structures, loop control structures, arrays, creating menus. Prerequisites: SCSC 138 or SBAD 290 or consent of instructor. Not for Computer Science major credit. [.](#)

150. Introduction to Computer Science (3) Current application, security and systems software, hardware devices, social and ethical issues in computing and information technology, propositional logic, search engines, and computer programming concepts. Basic problem solving, logic, and computer programming are introduced through an active learning environment. Prerequisite or Corequisite: SMTH126 or consent of instructor. [.](#)

200. Computer Science I (3) Design, analysis and testing of algorithms and classes, including programming from an Object-Oriented perspective, simple data types, control structures, arrays, file I/O, and complexity analysis. Prerequisite or Corequisite: SMTH 174 or consent of the instructor. [.](#)

210. Computer Organization (3) Computer organization, logic gates and expressions, circuits, CPU, memory, numbering systems, assembly language programming, instruction formats, and addressing modes. Prerequisite: C or better in SCSC 200 or consent of instructor. [.](#)

234. Visual BASIC Programming (3) Basic and advanced programming in the Visual BASIC language including visual object design, active-X objects, access to database objects, dynamic data exchange, object linking and embedding. Prerequisite: C or better in SCSC 200 or consent of instructor. [.](#)

238. C++ Programming (3) Introduction to C++ as a second object-oriented language with concepts of OO programming, data abstraction, polymorphism, inheritance, graphical user interface design with MFC, and memory management issues. Prerequisite: C or better in SCSC 200 or consent of instructor. [.](#)

239. Visual BASIC Programming II for Non-Majors (3) Modular programming, algorithmic design, string manipulation, array processing, sequential and random file processing in the BASIC language. Not for Computer Science major credit. Prerequisites: SCSC 139 or consent of instructor. [.](#)

300. Computer Science II (3) Advanced design, analysis and testing of algorithms and

classes, including inheritance, polymorphism, UML, complexity analysis, recursion, search and sorting techniques, linked lists, stacks and queues. Prerequisite: C or better in SCSC 200 or consent of instructor. ▾

310. Introduction to Computer Architecture (3) Computer organization and architecture, basic processor design, hardwired and microprogrammed control, ALU, memory organization, data paths, pipelining, and interfacing and communications. Prerequisite: C or better in SCSC 210 or consent of instructor. ▾

311. Information Systems Hardware and Software (3) An introduction to computer and systems architecture and operating systems for system development personnel. Topics include CPU architecture, instructions sets, memory, registers, input/output, and operating system modules such as process management, memory and file management. Prerequisite: C or better in SCSC 200 or consent of instructor. ▾

314. Introduction to Robotics (3) Fundamentals concepts of industrial robotics including kinematics, 3D coordinate transformation, robot motion, robot control and sensing, robot programming, and computer vision. A review of new technologies for computer-integrated manufacturing, computer-aided design and computer-aided manufacturing, automated material handling, and flexible manufacturing systems is included. Students are required to write programs in order to demonstrate the laboratory projects. Prerequisites: C or better in SCSC 200 and SMTH 127, or consent of instructor. ▾

315. Networking Technology (3) Basic concepts of computer networks, data telecommunication and distributed applications, including network topology, hardware, software, protocol, security, and the implications of network technologies on the deployment and implementation of networked systems. Not for CS or CIS major credit. Prerequisites: SCSC 300 or SIMS 305 or consent of instructor. ▾

321. Computer Science III (3) Design, analysis and testing of advanced data structures, including priority queues, trees, binary search trees, tree traversals and balancing techniques, hashing, and graph theory. Prerequisite: C or better in SCSC 300 or consent of instructor. ▾

325. Fundamentals of Relational Database Management Systems (3) Basic architecture, structures, and query languages. Topics include design and implementation of RDBMS, relational data models, conceptual modeling, data independence, specification of data requirements, normalization, recovery and security. Not for CS or CIS major credit. Prerequisites: SCSC 300 or SIMS 305 or consent of instructor. ▾

355. Digital Forensics (3) Methods, tools and techniques used to maximize efficiency in investigations that involve digital devices, including malicious code analysis, techniques of evaluation of the physical memory of a compromised machine, digital forensics tools, challenges of anti-forensics phenomena, and use and management of storage area network technology for evidence storage. Prerequisites: C or better in SCSC 300 and

SCSC 311; or consent of instructor. .

356. Cryptography (3) Historical and modern techniques of encryption and decryption, classical cryptosystems, public-key cryptosystems, authentication, anonymity, zero-knowledge protocols, smart cards and other everyday applications of cryptographic algorithms, prime numbers, elementary number theory and algorithms that support efficient arithmetic on large integers. Prerequisite: C or better in SCSC 300 or consent of instructor. .

399. Independent Study (1-9) As needed. .

401. Introduction to Systems Simulation (3) Simulation languages, techniques, and methodology as applied to research problems from science and computer systems. Design of simulation experiments for optimizations and applications. Prerequisites: C or better in SCSC 310, 321, and SMTH 144; or consent of instructor. .

412. Computer Networks I (3) Introduce the basic concepts needed to design, implement, and manage networks. Transmission media, topologies, local area and wide area network technologies, communication protocols, standards, network architectures, security, and network operating systems are examined. Prerequisite: C or better in SCSC 300, or consent of instructor. .

416. Parallel Computing (3) Fundamental concepts of parallel computing (parallel architectures, memory, interconnection topologies, compilers, operating systems and input-output constraints), design and analysis of parallel algorithms (performance measures and complexities); and principles of parallel programming languages (level of parallelism, message passing and shared-address space parallelism, mapping and granularity). Prerequisites: C or better in SCSC 310 and SCSC 321 or consent of instructor. .

421. Design and Analysis of Algorithms (3) Concepts and fundamental strategies of algorithm design; the analysis of computing time and memory requirements; the theory of computational complexity (NP-hard and NPcomplete); graph manipulation algorithms (connected components, minimum spanning trees, traveling salesman, cycles in a graph, and coloring of graphs); search algorithms (depth-first, breadth-first, best-first, and alpha-beta minimax); and computational algorithms (matrix multiplication, systems of linear equations, expression evaluation, and sorting). Prerequisite: C or better in SCSC 321 or consent or instructor. .

440. Object Oriented Systems Analysis and Design (3) Analysis and design of information systems using object oriented methodologies. Emphasis is on effective communication and integration with users and user systems, interpersonal skill development with clients, users, team members, and others associated with development, operation, and maintenance of the system, use of modeling tools, adherence to methodological life-cycle and project management standards. Prerequisite: C or better in SCSC 300 or consent of instructor. .

441. Experiential Learning in Computer Science (3) Experience in a business, educational, or non-profit computing environment. Prerequisite: approval of the instructor. Pass/fail credit. ▾

450. E-Business Web Application Development (3) A project-oriented course involving the complete application development of an online commercial Website. Basic Webpage design including HTML and Style Sheets is covered, but the focus is on what happens behind the scenes of a business Website, including client versus server-side information processing, CGI and Event-Driven programming, data transmission, storage and compression, risk analysis, and security issues. Prerequisite: C or better in SCSC 300 or consent of instructor. ▾

455. Computer Security (3) A survey of the fundamentals of information security, including risks and vulnerabilities, policy formation, controls and protection methods, database security, encryption, authentication technologies, host-based and network-based security issues, personnel and physical security issues, issues of law and privacy. Prerequisite: C or better in SCSC 300 or consent of instructor. ▾

499. Directed Research (3) An investigation of technical papers from the instructor's area of research. The composition and presentation of technical papers that either survey the existing literature or make an original contribution to the research area is required. Prerequisite: C or better in SCSC 300 or consent of instructor. ▾

509. Topics in Computer Science (3) Selected topics of special interest in computer science. May be repeated for credit. Prerequisite: consent of instructor. ▾

511. Operating Systems (3) Introduces the fundamentals of operating systems design and implementation, including an overview of the components of an operating system, mutual exclusion and synchronization, I/O, interrupts, implementation of processes, scheduling algorithms, memory management, and file systems. Prerequisites: C or better in SCSC 210 and SCSC 321 or consent of instructor. ▾

512. Computer Networks II (3) Advanced topics in telecommunications, location positioning systems and computer networking, including wireless and mobile computing, integration of wireless and wired networks, design issues, packet transmission, datagram encapsulation and fragmentation, media access control, data transmission and retransmission, routing, bridging, switching, addressing, error handling, flow control, data security, and local and wide-area networks. Prerequisite: C or better in SCSC 412 or consent of instructor. ▾

515. Wireless Networks (3) Fundamental concepts and techniques employed in wireless and mobile networks such as cellular networks, wireless LANs, and ad-hoc networks. Topics include wireless communication basics, access technologies, medium access control, naming and addressing, routing, mobility support and management, security, and power management. Prerequisite: C or better in SCSC 412 or consent of instructor. ▾

516. Distributed and Network Programming (3) Design and implementation of distributed application and network communication programs, including network application development with UCP and TCP/IP protocols, introduction to distributed systems and computing, RIM, socket programming, client/server models, and communication primitives, such as datagrams, packet retransmission, routing, addressing, error handling, and flow control. Prerequisite: C or better in SCSC 321 or consent of the instructor. .

520. Database System Design (3) Database Management System (DBMS) architecture and organization, design, and implementation of DBMS, data models, internal database structures, conceptual modeling, data independence, data definition language, database manipulation language, normalization, transaction processing, recovery, and security. Prerequisite: C or better in SCSC 300 or consent of instructor. .

521. Database Implementation, Application, and Administration (3) Design and implementation of database and client/server applications, in-depth treatments of embedded queries and stored procedures, database triggers, database extended languages, architectures and design patterns of distributed application, transaction processing, performance tuning, recovery and backups, auditing, and security. Prerequisite: C or better in SCSC 520 or consent of instructor. .

525. Knowledge Discovery and Data Mining (3) Extraction and discovery of knowledge from large databases, data integration and data warehousing, data mining algorithms, models, and applications including association rule mining information retrieve (IR) and mining of text databases, decision tree, decision rules, classification techniques, cluster analysis, and evaluation, visualization, and interpretation of patterns. Prerequisite: C or better in SCSC 300 or consent of instructor. .

530. Programming Language Structures (3) Paradigms and fundamental concepts of programming languages, such as scope, binding, abstraction, encapsulation, typing, and language syntax and semantics. Functional and logic programming paradigms are also introduced through sample programming languages. Prerequisites: C or better in SCSC 210 and SCSC 321 or consent of instructor. .

531. Introduction to Compiler Construction (3) Concepts, design, implementation and construction techniques for programming language translator; simple one-pass compiler; lexical analysis (token specification and recognition); syntax and semantics analysis (context-free grammars, top-down, bottom-up and operator precedence parsing, LL-and LR-parser techniques, treating ambiguous grammars, and error recovery). Prerequisite: C or better in SCSC 530 or consent of instructor. .

540. Software Engineering (3) Methods and tools of software engineering, software life cycle, specification and design of software, software testing, cost and effort estimation, project management, risk analysis, and documentation. A relatively large software system is developed in a team environment. Prerequisite: C or better in SCSC 321 or consent of

instructor. .

SCSC 555. Advanced Computer Security and Information Assurance (3)

Cryptography, telecommunication and network security, applications and system development security, Business Continuity Planning (BCP), cyber-crimes and countermeasures. The hands-on laboratories provide extensive practices on firewalls, Virtual Private Networks (VPN), Intrusion Detection Systems (IDS), and other computer security tools. Prerequisites: C or better in SCSC 412 and SCSC 455; or consent of instructor. .

560. Numerical Analysis (3) (=SMTH 560) Difference calculus, direct and interactive techniques for matrix inversion, eigenvalue problems, numerical solutions of initial value problems in ordinary differential equations, stability, error analysis, and laboratory applications. Prerequisites: SMTH 245 and 344, and programming competency. .

580. Introduction to Artificial Intelligence (3) Intelligent agents, expert systems, heuristic searching, knowledge representation and reasoning, artificial neural networks, ontologies, and natural language processing. Prerequisite: C or better in SCSC 321 or consent of instructor. .

585. Introduction to Computer Vision (3) Processing and analyzing features in still digital images, camera calibration, stereopsis, object recognition, the processing of edges, regions, shading and texture, and introductory video processing techniques. Prerequisites: C or better in SCSC 321 and SMTH 143 or consent of instructor. .

599. Computer Science Senior Seminar (3) Integration of knowledge at an advanced level, a review of recent developments in theoretical and applied computer science, the exploration of ethical issues, along with research and oral presentation. Prerequisites: 12 hours of 300 level or above computer science courses and consent of instructor. .