Computer Science Courses

**CSC 501 Programming Languages (A).** *Prerequisites: CSC 311.* Studies the concepts of various programming languages. Includes these topics: history of languages, design principles, formal syntax and semantics, implementation: compilation and interpretation, comparative study of features in various languages considering criteria such as binding, scope, type conversion, data abstraction, parameter passing techniques, exceptions and I/O. Covers various programming paradigms such as procedural, object-oriented, functional, logic and scripting. Requires extensive programming. 3 Cr. Every Semester.

**CSC 506 Algorithms and Data Structures (A).** *Prerequisites: CSC 205 and MTH 481.* Covers design and analysis of data structures and associated algorithms using object-oriented methods. Includes these topics: complexity measures, pre- and post-conditions, programming to interfaces, union-find sets, hashing, trees (AVL, splay, B-Trees), graphs, recursion, algorithm design strategies and NP-completeness. Requires extensive programming. 3 Cr. Every semester.

**CSC 511 Computer Architecture (A).** *Prerequisites: CSC 303 and CSC 311.* Covers design and organization of digital computers. Includes these topics: digital logic and circuit design, data representation, computer history, performance evaluation, CISC/RISC architectures, registers, memories and memory management, CPU and ALU architectures, instruction sets, busses and I/O systems, interrupt structure, microprogramming and control unit design. Covers additional topics such as virtual machines, parallelism and pipelining. 3 Cr. Every semester.

**CSC 512 Operating Systems (A).** *Prerequisites: CSC 219 and CSC 411.* Covers basic principles of operating systems. Includes these topics: OS structures and design principles, concurrent processes and programming, threads, CPU scheduling, memory management and virtual memory, process synchronization and deadlock, file systems, mass-storage structure, I/O systems, and case study of UNIX/LINUX operating system. Requires extensive programming. 3 Cr. Spring.
CSC 519 Computer Networks (A). Prerequisites: CSC 303 and CSC 311. Provides a comprehensive study of the field of computer communications, local area networks, and internetworking. Includes these topics: the OSI and TCP/IP models, protocols, topologies, data communication issues, error detection and correction, local area networks, network hardware, Ethernet and wireless technologies, WAN, packet-switching, routing, datagrams, Internet addressing, home networking and security. Includes hands-on experience with network hardware and software. 3 Cr. Fall.

CSC 521 Computer and Network Security (A). Prerequisite: CSC 419 or CIS 419. Studies concepts, techniques and tools in computer and network security. Includes these topics: security, privacy, information assurance, threats, user authentication and access control; Unix and Windows examples; logs and intrusion detection; cryptography, public-key and private-key systems; Kerberos, IP security, firewalls, Web and database access control and security issues; ethical issues. Includes hands-on experience with security hardware and software. 3 Cr. Spring.

CSC 522 Relational Database Design (A). Prerequisite: CSC 205. Provides a study of the theory and practice of the relational approach to database design. Includes these topics: DBMS vs. traditional file processing, relational algebra, normalization, lossless and/or dependency preserving decomposition, query languages such as SQL and a language that is available on the system, query optimization, integrity and security, database project design. Requires extensive programming. 3 Cr. Spring.

CSC 527 Software Systems Engineering (A). Prerequisite: CSC 311. Provides an introduction to software engineering methodologies and programming-in-the-large. Includes these topics: life-cycle models, development standards, project organization, estimation techniques, requirements modeling, specification techniques, object-oriented and structured approaches to software design, implementation issues, testing, verification and validation, maintenance and documentation. Requires students to work in teams developing a large-scale software product. Develops technical communication and writing skills. Requires extensive programming. 3 Cr. Fall.

CSC 529 Object-Oriented Software Development (A). Prerequisite: CSC 427. Provides an introduction to OOP concepts and their applications using Java. Includes these topics: review of OOP fundamentals, UML modeling; advanced Java features: interfaces, abstract classes, GUI programming, layout managers, event and exception handlers, etc.; software design principles, cohesion and coupling; detailed coverage of design patterns: model-view-controller, observer, adapter, factory, strategy, singleton, etc.; software quality assurance: testing strategies. Requires extensive programming. 3 Cr. Spring.

CSC 534: Artificial Intelligence (A). Prerequisite: CSC 401. Provides an introduction to artificial intelligence, its applications, and languages. Includes these topics: problem solving using state space search, heuristics, *A* algorithm, game playing, mini-max, alpha-beta, knowledge-based expert systems, forward and backward chaining, natural language understanding, evolutionary computing, cellular automata, genetic algorithms, neural networks; programming AI applications using Prolog, LISP, and/or using frameworks in Java. Requires extensive programming. 3 Cr. Fall.

CSC 542 Electronic Commerce Technology (A). Prerequisites: CSC 209 and CIS 422 or CSC 422. Surveys electronic commerce technologies and realities. Studies defining tools of e-business to understand the manner in which users, tools, needs and opportunities interact. Includes these topics: the infrastructure of e-commerce and the design and implementation of e-business portals using network and database technologies, data/ Web mining and security/encryption techniques for finding and negotiating with trading partners to execute electronic transactions. 3 Cr. Fall.

CSC 544 Introduction to Parallel Computing (A). Prerequisites: CSC 406 and MTH 481. Deals with design and analysis of parallel algorithms. Includes these topics: parallel models of computation; measures of complexity; parallel algorithms for selection, searching, sorting, and merging; matrix algorithms; transitive closure; connected components; and shortest path, minimum spanning tree and routing algorithms. Provides hands-on experience in a parallel programming environment. 3 Cr.

CSC 583 Theory of Computation (A). Prerequisites: CSC 203 and MTH 481. Studies formal languages and theory of automata with an emphasis on Church’s thesis, “algorithm = machine” point of view. Includes these topics: regular expressions and context-free languages, finite and pushdown automata, Turing machines, computability, undecidability and complexity of problems. 3 Cr.

CSC 595 Topics in Computer Science (A). Prerequisite: Published prior to registration each semester. As an advanced course, addresses current topics in the field. Each offering is motivated by the expertise of the instructor and students’ interests. Expects students to complete a major research, design or development project. Descriptions and prerequisites are published prior to the registration period for the course. Past topics covered
CRJ 534 Security Administration (B). Provides a comprehensive examination of the nature and problems of private and public security administration. Focuses on the issues of administration and the solutions, especially security technology necessary for successful management. 3 Cr.

CRJ 536 Computer Security (B). Examines the nature, problems and programs to protect organizational information, especially electronically processed data and computer equipment. 3 Cr.

CRJ 551 International Criminal Justice Systems (A). Compares and contrasts the criminal justice system of the United States with the systems of other countries. 3 Cr.

CRJ 565 Terrorism and the Criminal Justice System (A). Examines current terrorism, its origins and ideological bases, with particular attention to its relation to political institutions and the criminal justice response. 3 Cr.

CRJ 571 Research Methods in Criminal Justice (A). Familiarizes criminal justice majors with the development of data-gathering techniques, including scaling, questionnaire construction, sampling procedures, interviewing, secondary data analysis, and techniques of data processing using micro- and minicomputers. Also examines linear causal models as a tool in theory and research, research designs, central tendency, variation and statistics for nominal and ordinal measures. 3 Cr.

CSC 611 Advanced Computer Architecture (A). Prerequisites: CSC 411, MTH 346 and MTH 481. As an advanced course in architecture of high-performance computer systems, emphasizes quantitative analysis. Includes: measuring performance, cost trends, CISC versus RISC, pipelined processors, branch penalties and prediction, memory hierarchy, cache organization, virtual memory, parallel processors, SIMD/MIMD systems, interconnection networks and distributed computing. 3 Cr.

CSC 683 Automata Theory and Formal Languages (A). Prerequisite: MTH 481. Provides an advanced treatment of the mathematical foundations of computer science, including the theories of automata, formal languages, computability and computational complexity. Includes some of the fundamental material regarding finite automata and context-free grammars as part of regularly accredited undergraduate programs, covering the material more quickly in this course. 3 Cr.