2015-2016 Computer Science and Information Systems Course Descriptions

CSC 100   Introduction to Information Management. An introduction to tools and assessment methods involved in the management of information. Students will gain facility with spreadsheet and database software in a problem-solving context. This course is designed to be useful for Mount Union students in all disciplines. 2 Semester Hours.

CSC 101   Introduction to Virtual Reality. An introduction to virtual reality environments. There are two main components of the course; a history of virtual realities and an introduction to living and building in a virtual space. Building skills will include the creation of web pages, image files, audio files, movies, and virtual objects. 2 Semester Hours.

CSC 105   Introduction to Linux. This course provides an introduction to the Linux operating system, from a user's perspective. Topics include installation, software installation and updates, security issues, network configuration, file systems, graphical and command line interfaces, and shell programming to automate repetitive tasks.   2 Semester Hours.

CSC 108   Introduction to Computer Programming. A first experience in computer programming for students who have no previous programming experience.   2 Semester Hours.

CSC 120   Programming and Problem Solving I. Introduction to object-oriented programming with a focus on algorithms and their use in problem solving. Students will develop concrete problem solving and programming skills through hands-on laboratory experience.   4 Semester Hours.

CSC 199   Special Topics in Computer Science. A course designed to permit the offering of special subjects appropriate to the program of the department. Such offerings will fill special needs of specific students, take advantage of the expertise of a visiting professor, or serve as an initial experimental offering of a contemplated regular course. Lower divisional offerings will be listed as 199. Regular or frequently recurring topics are not offered under this title. Prerequisite: permission of the instructor. May be repeated as new topics are presented. Credit variable, 1-4 Semester Hours.

CSC 220   Programming and Problem Solving II. Intermediate object-oriented programming using a visually-oriented, forms-based language. Concepts include encapsulation, inheritance, polymorphism, recursion, database and file management, and software testing.   Prerequisite: CSC 120. 4 Semester Hours.

CSC 230   Fundamentals of Bio-Inspired Computing. This course presents an overview of the two fields of Neural Computation and Evolutionary Computation. The biological components that govern brain function and the cognitive frameworks and the behaviors that emerge will be studied. Neural models of computation that simulate the workings of the brains of living creatures will be investigated. The historical foundations of evolutionary thought are explored with particular emphasis on computational simulations of its models and operations. Topics include: computational neural networks, evolutionary programming, natural selection, evolved cooperation / competition, cellular automata, genetic algorithms, ant-colony optimization, swarm intelligence and artificial life. Prerequisite: CSC 120. Familiarity with genetics or evolution is not required as a prerequisite, but may be helpful. 4 Semester Hours.

CSC 270   Computer Organization. An introductory course in computer organization and design that additionally covers assembly language programming. Concepts studied apply to various hardware platforms. Students will learn the basic principles governing the organization of computer hardware components, how those components interact, and how the components may be controlled via layers of software. Topics investigated will include: digital logic, registers, addressing modes, instruction execution, instruction sets and various number systems, and an introduction to operating system concepts. Prerequisites: CSC 120 and MTH 125. 4 Semester Hours.

CSC 280   Computer Simulation. A comprehensive and practical study of modeling and simulation of real-world systems on computer hardware. The main focus of the course will be simulation of discrete systems using a simulation library for a typical modern programming language. Students will also explore random number generation, methods for modeling real-world systems, and special purpose simulation environments Students will use tools to visualize model results and to test different model assumptions while learning about the mathematics that underlie the simulations. Prerequisites: MTH 123 and CSC 120. 4 Semester Hours.

CSC 299   Special Topics in Computer Science. A course designed to permit the offering of special subjects appropriate to the Computer Science program at the sophomore level. Such offerings will fill special needs of specific students, take advantage of the expertise of a visiting professor, or serve as an initial experimental offering of a contemplated regular course. Regular or frequently recurring topics are not offered under this title. Prerequisite: as established by the department. May be repeated as new topics are presented. Credit variable. 1-4 Semester Hours.

CSC 310   Database Theory and Implementation. A theoretical introduction to database models, database design, normalization and data administration. Specific applications are studied and developed using fourth generation languages. Prerequisite: CSC 220. 4 Semester Hours.

CSC 320   Algorithms and Data Structures. Topics covered include linked lists, stacks, queues, trees, recursion, searching, sorting, hashing, and analysis and measurement of algorithms. Prerequisites: CSC 220, MTH 125 and MTH 141. 4 Semester Hours.

CSC 330   Mobile Device Programming.   In this course the student will learn new protocols and/or a new programming language in order to program mobile devices such as tablets and smart phones. Prerequisite: CSC 220. 4 Semester Hours.

CSC 360   Computer Networks. This course provides an introduction to the technologies used in computer networks. Topics include network architecture, network protocols, and software and hardware implementations of the protocols. Prerequisite: CSC 220 or CSC 270. 4 Semester Hours.

CSC 370   Operating Systems. The study of software designed to control the operation of the components of a computer system. A survey of typical operating systems is included along with investigation of concurrent processes, deadlock, memory management, file systems, processor scheduling/utilization, and distributed and/or parallel systems. Programming skills will be utilized and expanded. Prerequisites: CSC 220 and CSC 270. 4 Semester Hours.

CSC 380   Computer Graphics. This course is intended to provide an understanding of the principles behind the art and science of computer graphics. The subject matter is broad and combines elements of computer hardware and software, mathematics and numerical methods, art, and programming with complex data structures. Prerequisite: CSC 220. 4 Semester Hours.

CSC 399   Special Topics in Computer Science. A course designed to permit the offering of special subjects appropriate to the program of the department. Such offerings will fill special needs of specific students, take advantage of the expertise of a visiting professor, or serve as an initial experimental offering of a contemplated regular course. Upper divisional offerings will be listed as 399. Regular or frequently recurring topics are not offered under this title. Prerequisite: permission of the instructor. May be repeated as new topics are presented. Credit variable, 1-4 Semester Hours.

CSC 410   Web Database Programming. An introduction to programming client-server applications that use a web browser on client machines and a database engine on the server. The course includes programming the user interface and the database interface. Prerequisite: CSC 220. 4 Semester Hours.

CSC 420   Principles of Programming Languages. A study of the principles of the design and implementation of computer programming languages. Topics include syntax, lexical analysis, Backus-Naur Form, parsing, compilers, interpreters, binding, and the run-time environment. Languages of various types are examined. Prerequisites: CSC 220 and MTH 125. 4 Semester Hours.

CSC 430   Programming Parallel Computing Systems. This course provides the student with an in-depth introduction to programming parallel computer systems. Major topics include the taxonomy of parallel systems and parallel algorithms. Programming assignments on GPU systems will provide hands-on experience. Prerequisites: MTH 125 and CSC 220. 4 Semester Hours.

CSC 450   Theory of Computation. Topics covered include finite automata, pushdown automata, Turing machines, regular languages, context-free languages, recursively enumerable languages, and the halting problem. Prerequisites: CSC 220 and MTH 125. 4 Semester Hours.

CSC 460   Network Security. This course provides an introduction to the subject of computer and network security. It will cover major threats to security and tools developed to defend against such threats. Prerequisites: MTH 125 and CSC 360. 4 Semester Hours.

CSC 470   Computer Architecture and Design. An examination of design principles and techniques used in contemporary microprocessors and computers to achieve high performance. Topics include pipelining, caching, parallelism, code optimization, and case studies of real-world systems.   Prerequisites: CSC 220 and CSC 270. 4 Semester Hours.

CSC 480   Artificial Intelligence. An overview of the field of Artificial Intelligence, including: knowledge representation, logical systems, forward and backward reasoning, searching, learning, planning, natural language processing, case- and rule-based systems, and genetic algorithms. Prerequisite: CSC 220. 4 Semester Hours.

CSC 491   Software Engineering Fundamentals. A study of software development characterized by a practical, orderly and measured development process. The dominant features of this process are requirements specification, selection of a software life cycle model, software testing, project management techniques and quality assurance. Prerequisite: Junior standing in the CS or IS major. 2 Semester Hours.

CSC 492   The Practice of Software Engineering. A continuation of the study of software engineering practices begun in CSC 491. Issues of team-building, project planning and configuration management will be explored. Each student will complete a significant software development or research project as part of a team. Prerequisite: CSC 491. 2 Semester Hours.

CSC 494   Honors Thesis/Project. A research/project course designed to meet the needs of the individual student seeking honors in the major at graduation. Prerequisites: junior or senior standing, and approval of the instructor, the department chair and the Honors Review Board. Credit variable, 4-8 Semester Hours.

CSC 496   Independent Study. Students design and implement a project. A contract signed by the student, the instructor, and the department chair details the specific project requirements. May be repeated for credit. Prerequisites: Senior standing. 2-4 Semester Hours.

CSC 499   Internship. This course provides a significant learning experience outside of the academic environment and related to the student's career goals. Students conduct their internship activities at an industrial, business, or financial organization, or at a research laboratory. A contract signed by the student, the supervisor, and the departmental representative details the specific activities and requirements. May not be repeated for credit. Prerequisites: Senior standing, cumulative average of 2.50, average of 3.00 in computer science courses, and recommendation of the Computer Science and Information Systems Internship Selection Committee. 4-16 Semester Hours.