

COMPUTER SCIENCE COURSE DESCRIPTIONS**ALL COURSES ARE THREE (3) SEMESTER CREDITS UNLESS OTHERWISE NOTED****CS 1000 Introduction to Computers**

This course is intended to provide a basic understanding of what a computer is and how it may be used to make a user more productive both at work and in the home. The basic assumption is that the student has very little experience with computers and how they work.

CS 1020 Computer Science Topics

Introduces the student to the main areas of study in the Computer Science discipline. These areas include digital systems and concepts, operating systems, computer architecture, graph theory, artificial intelligence, and the theory of programming languages. Prerequisite: CS 1000

CS 1030 Computer Programming Fundamentals I

This introduction to programming using C++ will teach the student basic computer programming skills. Topics will include: modular design, control structures, functions and subroutines, arrays, and parameter passing. Prerequisite: CS 1000

CS 1040 Web Site Development

This course provides a basic understanding of the Internet, e-commerce terminology, and web site development. The student will create a web site using a web site development package. Prerequisite: CS/IT 1000

CS 2010 Information Management Systems

This course exposes the student to various types of information management systems in use today. Course topics include: a variety of data processing facilities, office automation, job descriptions, and requirements. Prerequisite: CS/IT 1000

CS 2020 Advanced Web Site Development

This course builds on CS 1040. The student will be exposed to HTML, Java, and other web site development languages. Prerequisite: CS 1040

CS 2030 Computer Programming Fundamentals II

This course builds on CS 1030. Using the C++ programming language, the course includes and in-depth coverage of multi-dimensional arrays, pointers, strings, and file structure. The student will also be introduced to recursion, classes, linked lists, and queues. Prerequisite: CS 1030

CS 2040 Algorithms and Data Structures

Course provides a basic understanding of data structures, abstract data types, complexity analysis, sorting, searching, file structures, database concepts, and graphic object manipulation. Prerequisite: CS 2030

CS 2050 Operating Systems

This course introduces the student to a variety of different operating systems with the personal computer. History, implementation, advantages and shortcomings will be evaluated and documented. An in-depth paper will be pre-requisite for this course. Prerequisite: CS 2040

CS 2060 Database Management Systems

This course is an introduction to databases: their practical application and management. The student will review how databases are used in today's organizations. Also discussed are effective approaches to managing the database systems. Prerequisite: CS/IT 1000

CS 2070 Computer Ethics and Law

This course presents various topics concerning economic, legal, political and social use of computers and computer technology. Course work includes a research paper. Prerequisite: CS/IT 1000

CS 2080 Programming with Visual Basic I

This course teaches control mechanisms, elementary data structures and basic programming using Visual Basic. The student will learn how to develop structured programs using this powerful language. Prerequisite: CS 2040

CS 2090 Programming with Visual Basic II

Continuation of CS 2080. This course introduces the student to advanced concepts of the Visual Basic programming language. Topics include: file input/output, library subroutines, and implementation of complex data structures. Prerequisite: CS 2080

CS 3020 Software Engineering Concepts

This course reviews the techniques and approaches to the creation of software. It follows a structured approach associated with the engineering disciplines. Prerequisite: CS/IT 2040

CS 3040 Database Theory and Design

This course is an overview of the basic concepts and principles of database management systems. Covers hierarchical and relational database constructs. Introduces the student to file construction, dictionaries, and user access languages. Prerequisite: CS 2060

CS 3050 Programming Languages

Students develop an understanding of the organization and design of programming languages through the formal study of programming language specifications and analysis. Prerequisite: CS 2040

CS 3060 Systems Analysis and Design I

This course is designed to provide the student with an understanding of the basic concepts associated with identifying and analyzing the flow of information in business environments. The techniques studied will prepare the student to design efficient specifications for improving and correcting information systems in general. The proper use of computers within these specifications will also be covered. The student will accomplish a systems analysis project. Prerequisite: CS/IT 1000

CS 3070 Systems Analysis and Design II

Continuation of CS 3060. The student will study concepts and methods used in a system life cycle development. The student will complete a system design and development. Prerequisite: CS 3060

CS 3080 Artificial Intelligence

Covers the basics of artificial intelligence, search and knowledge representation. It introduces topics in artificial intelligence such as planning, natural language processing, computer vision, learning and robotics. Prerequisite: CS/IT 1000

CS 3090 Computer Graphics

This course introduces the student to the fundamental areas of modern raster computer graphics, hardware, software, data structures, mathematical modeling, user interface and manipulation of graphics objects. A subset of the dimensional graphics is examined and implemented, with emphasis placed upon segmented display files and instant modeling. Prerequisite: MA 2080

CS 3120 Software Engineering Project

Continuation of CS 3020. Student will use the concepts from CS 3020 to develop a software project. Prerequisite: CS 3020

CS 3130 Data Communications

This course introduces the concepts and terminology used in current data communications systems. The concepts covered include protocols, encryption, transmission media, error correction, and various hardware issues. The basic processes of modulation and demodulation techniques are also covered. Prerequisite: MA 2080

CS 4010 Decision Support Systems

This course exposes the student to various types of decision support systems. The student will research various industries and companies that use decision support systems. Each student will complete a research paper on a specific decision support system. Prerequisite: CS 3080

CS 4020 File Organization

This course covers various types of file structures to include sequential, indexed, and hashed. The student will be introduced to various file access algorithms and performance characteristics. Prerequisite: CS 2040

CS 4030 Modeling and Simulation

Introduces students to the basic concepts and methods for using computers to model various real world systems. The student will be exposed to various mathematical techniques used to develop simulations on computers. Prerequisites: MA 2080 and CS 2040

CS 4040 Object-Oriented Programming

This introduction to programming using C++ for its object-oriented features will include structures, file input/output, data abstraction, classes (constructors, destructors, data members, member functions), operator overloading, inheritance, virtual functions, polymorphism, and templates. Prerequisite: CS 2040

CS 4060 Computer Networks

Course provides the student with an understanding of the hardware required to create local and wide-area networks to include routers, servers, workstations and interface cards. This includes the theory of packets, error detection and correction, and other concepts related to network communications. Prerequisite: CS 3130

CS 4150 Computer Architecture

Course provides the student with basic understanding of digital logic, digital systems, data representation, memory system organization and architecture, and an introduction to assembly language. Prerequisites: CS 1000 and CS 2050

CS 4980 Undergraduate Capstone Course Project

A capstone project for the Bachelor of Science degree student requiring the integration of all that has been learned into a project of the student's choice. (6 semester credits).

CS 5010 Computer Network Management

Detailed communications systems will be covered in depth. Packet switching networks, local area networks, satellite systems, the open systems interconnect (OSI) reference model, and the development of communications software. Prerequisite: CS 4060

CS 5020 Computer Architecture

Study of pipelined Central Processing Unit (CPU) design, vector programming, cache memory design and evaluation, and other state-of-the-art design concepts. Topics to be covered are the design and analysis of instruction set processors, memory management, paging, segmentation, I/O system design, multi-processors, networks, high level language computers, and object-based architecture. Prerequisite: CS 4150

CS 5030 Software Engineering

Course is based on students performing research into several topical areas to include: System specifications and design; System testing and verification; Software environments and tools. Prerequisite: CS 3020

CS 5050 Operating Systems

This course provides the students with research into distributed operating systems, system reliability, performance, evaluation and modeling concepts. Topics include: process management, memory management, and input/output management. Prerequisite: CS 2050

CS 5070 Algorithm Analysis

This course reviews various types of searching, sorting, and file access algorithms for correctness and performance. Prerequisite: CS 2040

CS 5080 Database Design and Organization

This course provides an advanced look at modern database systems and addresses the issues of inter-operability, environmental bonding, and object modeling techniques. Included is a review of management concepts required to oversee these new systems. Prerequisite: CS 2060

CS 5090 Programming Languages

This course covers characteristics and features of modern programming languages. Topics include: control and data structures; variable types; type checking; object oriented programming; graphics; Internet capability; and applications. Prerequisite: CS 3050

CS 6040 Web Site Development and Management

Topics will include but are not limited to: getting your web site listed and getting the most exposure; E-Commerce and credit card security; free advertising versus paid; buying a domain name; and marketing online. Prerequisite: CS 2020

CS 6070 Compiler Theory

The student will learn principles of compiler construction and operation. Topics will include: lexical analysis; symbol tables; parsing; type checking; optimization; and memory management. Prerequisite: CS 5070

CS 6220 Computer Performance Analysis

This course focuses on improving the performance of computer systems. Topics will include: optimizing programming languages/compilers; improving operating systems throughput; and increasing productivity. Prerequisite: CS 5020 and CS 5050

CS 6230 Software Testing and Validation

This course will cover various topics in software testing and quality assurance. Topics will include: various types of software testing; establishing testing specifications; and testing tools. Prerequisite: CS 5030

CS 6250 Formal Language Theory

Study of formal languages, automata, algorithm design, complexity classes, compatibility, process coordination, algorithms for artificial intelligence, and correctness. Prerequisite: CS 5070

CS 6980 Graduate Capstone Course Project

A capstone project requiring the student to integrate all that has been learned into a project of the student's choice. (6 semester credits)

CS 6990 Graduate Thesis

Required for those students proceeding on to the Ph.D. in computer Science. This course covers the Masters thesis for the Master of Science in Computer Science degree. The research topic will be selected by the student and approved by his or her Academic Advisor/Program Manager. The thesis effort applies research outcomes to a computer science-related topic. The graduate thesis will contain at least the following sections: Overview, Literature Review, Research Methodology, Presentation & Analysis of Data, Conclusions and a Bibliography.

(6 semester credits)