COMPUTER SCIENCE (CS)

CS-120 Survey of Computing

4 credits, Fall/Winter/Spring/Summer

A computer competency course to familiarize students with computer concepts, software applications and the implications of living in the digital age. Introduces students to computer concepts, including, but not limited to the Microsoft Windows environment, Microsoft Office Applications, hardware terminology, social media and the Internet. Prerequisites: WRD-098 or placement in WR-121Z

CS-125H HTML & Web Site Design

4 credits, Fall/Winter/Spring/Summer

Hands-on approach to planning, design, and developing published web sites using HTML tags in a text editor. The class focuses on basic HTML coding using HTML 5 models. Hyperlinks, images, cascading style sheets, forms, accessibility and design principles will be covered, as well as tools such as FTP clients, accessibility checkers, and validators. Prerequisites: BA-131 or CS-120 or higher or placement into CS-125H

CS-133J Front-end JavaScript I

4 credits, Winter

Design, programming, testing of scripted web pages using JavaScript for client-side applications and to call PHP-based server-side applications. Introduction to fundamental concepts of interactive web pages and server-side connectivity. Covers the Document Object Model (DOM) and programming constructs like variables, operators, functions, control structures, and exception handling. Emphasis on creating and consuming object literals and JSON objects.

Prerequisites: CS-125H

CS-135DB Microsoft Access

3 credits, Fall/Spring

Focuses on the advanced database capabilities using a current version of Microsoft Access. Topics include design, construction, and documentation of a database management system, designing reports, forms, advanced form techniques, advanced queries, customizing tables, and creating and using an application system with macros. Prerequisites: BA-131 or CS-120 or higher or placement into CS-135DB

CS-135I Advanced Web Design

4 credits, Winter

Plan and publish a professional, standards-based, accessible web site via a variety of tools. Complete market and user-needs analysis to best target site content and design. Create a graphical web site mock-up, then use CSS (including a framework and pre-processors), scripts, and multimedia to realize site goals. Emphasizes professional design techniques. Prerequisites: CS-125H

CS-140 Introduction to Operating Systems

4 credits, Fall/Spring

Introduction to the theory and practical foundations of the Windows, Linux/UNIX, and macOS desktop operating systems. Discussion of and practice with OS administration through installation, configuration, networking, security, and virtualization.

Prerequisites: CS-120 or equivalent placement

Prerequisites: MTH-050 or MTH-060 or placement in MTH-065 or higher Prerequisites: WRD-098 or placement in WR-121Z

CS-140L Linux for Programmers

4 credits, Fall

Introduction to the Linux command line and software development tools. Covers how to use the command line and build tools, including VIM, GCC/ G++, make, gdb, and others. Students will gain experience with the build tools by writing and debugging relatively complex programs in both C and C++.

Prerequisites: CS-162

CS-151 Networking 1

4 credits, Winter

This course introduces students to networking architectures, models, protocols, and components. These components facilitate the connection of users, devices, applications, and data through the internet and across modern computer networks. This course, along with CS-152 and CS-153, covers the topics of the Cisco CCNA certification exam. Prerequisites: CS-140 or CS-160, or Student Petition

CS-152 Networking 2

4 credits, Spring

This course focuses on switching technologies and router operations that support small-to-medium business networks. It includes wireless local area networks (WLANs) and security concepts. This course, along with CS-151 and CS-153, covers the topics of the Cisco CCNA certification exam.

Prerequisites: CS-151

CS-153 Networking 3

4 credits, Not Offered Every Year

This course describes the architectures and considerations related to designing, securing, operating, and troubleshooting enterprise networks. This course covers wide area network (WAN) technologies and quality of service (QoS) mechanisms used for secure remote access. It also introduces software-defined networking, virtualization, and automation concepts that support the digitalization of networks. This course, along with CS-151 and CS-152, covers the topics of the Cisco CCNA certification exam.

Prerequisites: CS-152

CS-160 Computer Science Orientation

4 credits, Fall/Winter/Spring

Examines foundational computing subjects used in Computer Science and Information Technology. Topics include computer architecture, electronic logic, data representation, networking, algorithms and programming, which are used in successive Computer Science courses. Information about degrees in Computer Science and Information Technology is also covered.

Recommended Prerequisites: MTH-060 or placement in MTH-065

CS-161 Computer Science I

4 credits, Fall/Winter

Introduction to fundamental concepts of structured programming, including problem solving, algorithm and program design, data types, loops, control structures, subroutines, and arrays. Learn to write structured programs in a high level programming language. Prerequisites: MTH-111Z or placement in MTH-112Z, or 4 years high school math

CS-162 Computer Science II

4 credits, Winter/Spring

Introduces fundamental concepts of object oriented programming and dynamic memory management. Covers objects, classes, pointers, dynamic memory allocation, linked lists, and program correctness, verification, and testing. Prerequisites: CS-161

CS-170 Python Programming

4 credits, Spring

This is an extensive look at the Python programming language. It covers variables, I/O, selection and repetition structures, functions, objects, classes, and exception handling.

Prerequisites: CS-162 or Student Petition

CS-181 CMS Web Development

4 credits, Winter

Explores creating dynamic and interactive websites via the use of a current content management systems (CMS). Includes installation of CMS/database, working with templates, creating efficient site navigation, enhancing sites using components, modules, plugins, and extensions, including shopping cart utilities and the creation of custom themes. Prerequisites: CS-125H

CS-182 Intro to Cloud Computing

4 credits, Winter

This course is an overview of foundational cloud computing concepts and practices. Topics include compute, storage, connectivity, security, and automation on cloud provider platforms. This course covers the topics of the CompTIA Cloud+ certification exam.

Prerequisites: CS-151 and CS-240W

Recommended Prerequisites: CS-153 and CS-240L

CS-205 System Programming and Architecture 4 credits, Winter

Introduces how high-level software runs on a computer system. Covers C programming and the assembly that C code becomes. Presents the fundamentals of computer architecture and how instructions and data are represented at the machine level. Provides experience analyzing compiled code to build necessary skills for future work in cybersecurity, operating systems, compilers, and other CS topics involving low-level computation.

Prerequisites: CS-162

CS-225 Computer End User Support

3 credits, Fall/Spring

Addresses professional and interpersonal skills needed by technicians who support and manage hardware and software information systems. Customer service skills; troubleshooting; helpdesk operation; product needs analysis, evaluation, purchase, and installation; technical documentation and training.

Prerequisites: CS-120 or placement in CS-121 or equivalent experience Prerequisites: WRD-098 or placement in WR-101 or WR-121Z

CS-227 Computer Hardware & Repair

4 credits, Fall

An in-depth course in computer hardware. Covers operational concepts, identification, installation, configuration, and troubleshooting of power supplies, motherboards, microprocessors, memory modules, disk drives, optical drives, and expansion cards. This course, in conjunction with CS-228, covers the topics of the CompTIA A+ certification exam.

CS-228 Computer OS Maintenance & Repair

4 credits, Winter

An in-depth course in operating system maintenance and

troubleshooting. Covers configuration, maintenance, and troubleshooting of desktop and mobile operating systems, the fundamentals of cloud computing, and client network configuration and troubleshooting. This course, in conjunction with CS-227, covers the topics on the CompTIA A+ certification exam.

Prerequisites: CS-227

CS-233J Front-end JavaScript II

4 credits, Spring

In-depth exploration of creating dynamic front-end website designs using modern JavaScript libraries and frameworks, including jQuery. Topics covered include shortcut DOM techniques, updated looping techniques, creating animation effects, and building AJAX applications using data from provided code as well as web APIs (Google, YouTube, Imgur). Prerequisites: CS-133J

CS-233W Full-Stack Web Development I

4 credits, Fall

Begin exploring the power of server-side JavaScript using Node.JS, NPM, and Express. Students will: use server-side JavaScript to implement common packages and bundle their own applications for consumer use; build custom web server applications to respond directly to HTTP requests; create, query, and manage NoSQL databases; and create views to combine user requests, database data, and static content into responsive, data-driven web applications.

Prerequisites: CS-133J

CS-234P PHP/MySQL Web Development

4 credits, Spring

Use PHP and MySQL to develop dynamic web sites for use on the Internet. Develop web sites ranging from simple online information forms to complex online applications. Introduce programming fundamentals including variables, control structures, functions and objects. Applications developed use MySQL as the backend database and will explore database connectivity, querying, and security. Prerequisites: CS-125H

Recommended Prerequisites: CS-275

CS-234W Full-Stack Web Development II

4 credits, Winter

Students will complete the stack by exploring a user-interface framework to create interactive, reusable, data-connected web components using React, JSX, and a variety of React Frameworks. Students will complete a MERN (MongoDb, Express, React, Node) portfolio application. Prerequisites: CS-233W

CS-240L Linux Administration 1

4 credits, Fall/Spring

Covers the fundamentals of the Linux operating system. Topics include: system architecture, installation, command line and file system. This course covers the topics of the Linux LPIC-1 Exam 101 certification. Prerequisites: CS-140

CS-240M macOS Administration

3 credits, Winter

Covers the fundamentals of installing, configuring, troubleshooting, and supporting the macOS operating system. Topics include: installation and setup, user accounts, file systems, data management, applications, network configuration, network services, peripherals, startup and troubleshooting. This course covers the topics of the Apple macOS Support Essentials certification exam. Prerequisites: CS-140

CS-240W Windows Desktop Administration

3 credits, Winter

Covers the fundamentals of installing, configuring, troubleshooting, and supporting the Windows operating system. Topics include: installation, managing disks and file systems, file access security, users, profiles and policies, groups, security, backup, remote access, printing, and troubleshooting. This course covers the topics of the Microsoft Configuring Windows Devices certification exam. Prerequisites: CS-140

CS-250 Discrete Structures I

4 credits. Winter

Students will be introduced to discrete structures and techniques for computing. The course, which is the first in the two-term sequence, aims to convey the skills in discrete mathematics that are used in the study and practice of computer science. Topics include: Sets; Graphs and trees; Functions: properties, recursive definitions, solving recurrences; Relations: properties, equivalence, partial order; Proof techniques: inductive proof; Counting techniques and discrete probability. Prerequisites: MTH-251Z

CS-251 Discrete Structures II

4 credits, Spring

Continuation of the introduction to discrete structures and techniques for computing started in CS-250. The course, which is the second in the two-term sequence, aims to convey the skills in discrete mathematics that are used in the study and practice of computer science. Topics include: Logic: propositional calculus, first-order predicate calculus; Formal reasoning: natural deduction, resolution; Applications to program correctness and automatic reasoning; Introduction to algebraic structures in computing.

Prerequisites: CS-250

CS-260 Data Structures

4 credits, Fall/Spring

Covers common data structures used for the storage and manipulation of data, as well as data abstraction, sorting algorithms, and algorithm analysis. Data structures include linked lists, stacks, queues, binary trees, btrees, hash tables, and graphs.

Prerequisites: CS-162

CS-275 Database Design

3 credits, Winter

Focuses on design of a relational database management systems (RDMS). Topics will include database development using the a) requirement, b) design, c) implementation model, database theory from flat table design to relational systems, entity-relationship models, one-toone, one-to-many, and many-to-many relationships, referential integrity, normalization of tables, database programming and querying with SQL, and database security. Although other platforms may be demonstrated, the majority of work will be done with MySQL Server. Prerequisites: CS-120 or placement into CS-275

CS-279W Windows Server Administration

4 credits, Spring

Covers the fundamentals of installing, configuring, troubleshooting, and supporting the Microsoft Windows Server operating system and network infrastructure. Topics include: installation, Active Directory, data storage, resource access, security, monitoring, and disaster recovery. This course introduces the topics of the Microsoft Installation, Storage, and Compute with Windows Server certification exam. Prerequisites: CS-151 and CS-240W

CS-280 Computer Science/CWE

1-6 credits, Fall/Winter/Spring/Summer

Cooperative work experience. This course provides supervised work experience to supplement the academic classroom environment. Work examples include user support, work with computer applications or programming languages, installation or management PC computer systems, and developing websites. May be repeated for up to 9 credits. Required: Student Petition.

Corequisites: CWE-281

CS-284 Network Security

3 credits. Winter

This course provides an introduction to the core security skills needed for monitoring, detecting, investigating, analyzing and responding to security events, thus protecting systems and organizations from cybersecurity risks, threats and vulnerabilities. This course covers the topics of the Cisco CyberOps Associate certification exam.

Prerequisites: CS-151

Recommended Prerequisites: CS-240L and CS-240W

CS-288W Windows Network Administration

4 credits, Winter

Continued coverage of network services and administration using Microsoft Windows Server. Topics include: IPv4 and IPv6 addressing, DNS, DHCP, IPAM, network protection, and remote access. This course covers the topics of the Microsoft Networking with Windows Server certification exam.

Prerequisites: CS-279W

CS-297N Networking Capstone

4 credits. Spring

The capstone course for the Computer & Network Administration AAS. Provides the opportunity to combine the discrete information learned from program classes together towards the completion of an enterpriselevel computer project. Focus can also be placed on researching, practicing, and obtaining an industry-standard certification credential. Emphasis will be placed on project planning, timeline management, creation of training documentation, and oral presentation of completed works. Required: Student Petition.

CS-297W Website Capstone

3 credits, Spring

Provides the opportunity to function in a production design environment, work cooperatively with students from other focus areas, and research emerging website technologies. Emphasis will be placed on client interaction, project teams, and accountability, as well as the development of a professional portfolio web site or completion of a research project in an emerging web-related technology.

Prerequisites: CS-133J and CS-135I