

# COMPUTER SCIENCE AND INFORMATION SYSTEM (CSIS)

## CSIS 1514 Business Computer Systems 3 s.h.

Hands-on business software, with emphasis on operating systems, word processing, database and spreadsheet applications. This course is not designed for beginning computer users. Beginning computer users should take CSIS 1500: Computer Literacy before taking this course.

## CSIS 1525 Survey of Modern Operating Systems 3 s.h.

This course presents the history of design and creation of the operating system, role and purpose of the operating system, functionality of a typical operating system, mechanisms to support client-server models, handheld devices, design issues (efficiency, robustness, flexibility, portability, security, compatibility). Influences of security, networking, multimedia, windowing systems. This course will introduce the Android, IOS, Linux, Windows, and Unix operating systems. This course is not applicable to the CSCI major. This course is not designed for beginning computer users. Beginning computer users should take CSIS 1500: Computer Literacy before taking this course.

## CSIS 1570 Web Systems and Technologies 3 s.h.

This course will cover the basics of web-based applications including related software, interfaces and digital media. Foundations of web-site development including design, implementation, and integration of web-site, multimedia integration, and security and accessibility issues.

**Prereq.:** CSIS 1590.

## CSIS 1590 Survey of Computer Science and Information Systems 3 s.h.

Concepts, theory, and contemporary issues underlying the computing sciences. Introduction to computer applications, the YSU computing environment, the use of communication and information networks, and basic problem solving techniques using computers. This course is not designed for beginning computer users. Beginning computer users should take CSIS 1514: Business Computer Systems before taking this course.

**Prereq.:** or concurrent MATH 1505 or MATH 1507 or at least Level 30 on the Mathematics Placement Test.

## CSIS 1595 Fundamentals of Programming and Problem-Solving 1 2 s.h.

Introduction to concepts, principles, and skills of programming using a high-level programming language. Topics include programming language characteristics, an integrated development environment, algorithms and pseudocode, variables, operators, conditional statements, looping statements, functions, arrays, testing, debugging, documentation and program style. Credit will not be given for both CSIS 1595 and CSIS 2610.

**Prereq.:** CSIS 1590 or MATH 1510 or MATH 1511 or Math Level 35.

**Coreq.:** CSIS 1595L.

## CSIS 1595L Fundamentals of Programming and Problem-Solving 1 Lab 1 s.h.

Programming laboratory for CSIS 1595 Fundamentals of Programming and Problem Solving 1. This laboratory will meet for 100 minutes per week.

**Coreq.:** CSIS 1595.

## CSIS 2605 Fundamentals of Programming and Problem- Solving 2 2 s.h.

Theory and application of programming principles, data and information structures, simple linked lists, searching, and sorting, software development life cycle. Practice using these concepts in an object-oriented programming language. Credit will not be given for both CSIS 2605 and CSIS 2610.

**Prereq.:** C or better in CSIS 1595.

**Coreq.:** CSIS 2605L.

## CSIS 2605L Fundamentals of Programming and Problem- Solving 2 Lab 1 s.h.

Programming laboratory for CSIS 2605: Fundamentals of Programming and Problem Solving 2. This laboratory will meet for 100 minutes per week.

**Coreq.:** CSIS 2605.

## CSIS 2610 Programming and Problem-Solving 3 s.h.

Problem solving methods and algorithms using a high-level programming language. Designing, coding, debugging, and documenting programs using techniques of good programming style. Credit will not be given for both CSIS 2610 and CSIS 1595 or CSIS 2605.

**Prereq.:** MATH 1513 or Math Level 45.

**Coreq.:** CSIS 2610L.

## CSIS 2610L Programming and Problem-Solving Lab 1 s.h.

Programming laboratory for CSIS 2610. This laboratory will meet for 100 minutes per week.

**Coreq.:** CSIS 2610.

## CSIS 2620 System Configuration and Maintenance 3 s.h.

Theory and practice of installing and maintaining hardware and software for complex systems. Motherboards, memories, storage devices, processors, power supplies, network interface cards, and I/O peripheral devices. Operating systems, startup and boot process, I/O peripheral devices, data backup, data protection and recovery, networking, security strategies, virtualization, and troubleshooting.

**Prereq.:** CSIS 1590 or CSIS 2605 or CSIS 2610.

## CSIS 2655 Personal Cyber Security 3 s.h.

PC system security including data assurance, standards and legal issues, and methods and procedures for guarding against potential software attack. Not applicable to the CIS, CSCI, or INFO major. Credit will not be given for 2655 if a student already received credit for CSIS 3755 or its equivalent.

## CSIS 2660 Foundations of Electronic Commerce 3 s.h.

Framework of electronic commerce, including e-commerce architecture, infrastructure, technologies, tools, and strategies. Topics include security, environmental, and implementation issues. Includes web site analysis, hardware/software issues, mini-cases, and introduction to site development.

**Prereq.:** CSIS 1590.

## CSIS 2699 Computer Science and Information Systems Internship 1-3 s.h.

Classroom theory applied to on-the-job professional experience related to the student's major. Work for a minimum of 12 hours per week at an approved site, complete a related project, and attend seminars. May be repeated once with the permission of coordinator.

**Prereq.:** Sophomore in good standing and permission of internship coordinator.

## CSIS 3700 Data Structures and Objects 3 s.h.

Program design, style and expression, testing and debugging for larger programs. Introductory concepts of object-oriented programming, including classes, methods, encapsulation, and abstract data types. Theory and application of data structures, including linked structures, priority queues, trees, networks, and graphs.

**Prereq.:** "C" or better in either CSIS 2605 or CSIS 2610.

**Coreq.:** CSIS 3700L.

## CSIS 3700L Data Structures and Objects Lab 1 s.h.

Programming laboratory for CSIS 3700: Data Structures and Objects. This laboratory will meet for 100 minutes per week.

**Prereq.:** "C" or better in either CSIS 2605 or CSIS 2610.

**Coreq.:** CSIS 3700.

## CSIS 3701 Advanced Object-oriented Programming 3 s.h.

Object-oriented design and programming, including classes, encapsulation, inheritance, polymorphism, exception handling, and generics. Design, development, and testing of large-scale programs using object-oriented programming.

**Prereq.:** "C" or better in either CSIS 2605 or CSIS 2610.

## CSIS 3722 Development of Databases 3 s.h.

This course covers concepts about data modelling, relational data model, Structured Query Language (SQL), relational database design and transaction processing. Storing, retrieving, updating and displaying data using Structured Query Language (SQL), functions and triggers. Secure operations performed by database administrators.

**Prereq.:** CSIS 1590 or CSIS 2605 or CSIS 2610.

**CSIS 3723 Networking Concepts and Administration 3 s.h.**

Overview of electronic communications concepts and technologies, with emphasis on Local Area Networks. Network topologies, design, administration, installed applications, and performance monitoring. Privacy, ethical and legal concerns.

**Prereq.:** CSIS 2605 or CSIS 2610.

**CSIS 3726 Visual/Object-Oriented Programming 4 s.h.**

Use of one or more visual programming languages in conjunction with the concepts of object-oriented programming. Development of interactive programs using a graphical user interface. Database and Internet programming. Three hours lecture, two hours lab.

**Prereq.:** CSIS 2605 or CSIS 2610.

**CSIS 3730 Computer Graphics 3 s.h.**

Techniques of computer raster graphics, including scan conversion, two- and three- dimensional clipping and windowing, transformations, and viewing in 3D. Algorithms and more advanced topics.

**Prereq.:** CSIS 3700 and MATH 1572.

**CSIS 3731 Human-Computer Interaction 3 s.h.**

Concepts of human-computer interaction, including human factors, performance analysis, cognitive processing, usability studies, environment, training, user and task analysis, ergonomics, and accessibility standards.

**Prereq.:** CSIS 2605 or CSIS 2610 or INFO 2663.

**CSIS 3737 Game Programming 3 s.h.**

Programming and development of computer games using a game programming environment. Software tools for coding 2D and 3D graphics and animation, sprites and other assets, and handling input events, motion, and collisions. Object-oriented programming and AI concepts for game development.

**Prereq.:** CSIS 1595 or CSIS 2610.

**CSIS 3738 Graphics and Animation for Gaming 3 s.h.**

Design and implementation of animated characters in 3D computer games. Mesh design creation; surface materials, textures, and lighting; skeletal and facial rigging; motion and animation. Underlying physical principles and realistic character design concepts. Use of 3D animation software.

**Prereq.:** CSIS 1595 or CSIS 2610.

**CSIS 3740 Computer Organization 4 s.h.**

Basic hardware components, structure, and implementation of computer systems. Assembly language and instruction set architecture. Combinational and sequential digital logic. CPU and control unit design.

**Prereq.:** CSIS 2605 or CSIS 2610.

**CSIS 3755 Information Assurance 3 s.h.**

Confidentiality, integrity, and authenticity of information. Methods of controlling access to electronic data, enforcing security policies, protecting against malicious attacks (including web site attacks), intrusion detection, and disaster recovery.

**Prereq.:** CSIS 1590 or CSIS 2605 or CSIS 2610.

**CSIS 3756 Security Design 3 s.h.**

Operating system security concepts, techniques and applications including MS Windows and LINUX/UNIX platforms. Includes a hands-on design project.

**Prereq.:** Either CSCI 5806 or CSIS 3755 and either CSIS 1525 or CIS 3718.

**CSIS 3757 Computer Forensics 3 s.h.**

Professional computer forensics, including methods and investigative techniques for the discovery and recovery of digital images and information at all levels, from PCs to large information systems. Chain of evidence and investigative techniques for cybercrime detection.

**Prereq.:** CSIS 3755.

**CSIS 3760 Electronic Commerce Programming 3 s.h.**

Programming for client/server systems related to electronic commerce, including server-side languages such as Perl and Client-side languages such as JavaScript. Topics include form validation and parsing, database access and manipulation, and design, networking, and security issues.

**Prereq.:** CSIS 2605 or CSIS 2610.

**CSIS 3782 Cisco Networking Academy 1 3 s.h.**

Introduction to Networks (ITN) covers the architecture, structure, functions and components of the Internet and other computer networks. Students achieve a basic understanding of how networks operate and how to build simple local area networks (LAN), perform basic configurations for routers and switches, and implement Internet Protocol (IP). Two hours lecture and two hours lab per week.

**Prereq.:** CSIS 1590.

**CSIS 3783 Cisco Networking Academy 2 3 s.h.**

Switching, Routing, and Wireless Essentials (SRWE) covers the architecture, components, and operations of routers and switches in small networks and introduces wireless local area networks (WLAN) and security concepts. Students learn how to configure and troubleshoot routers and switches for advanced functionality using security best practices and resolve common issues with protocols in both IPv4 and IPv6 networks. Two hours lecture and two hours lab per week.

**Prereq.:** CSIS 3782.

**CSIS 3784 Cisco Networking Academy 3 3 s.h.**

Enterprise Networking, Security, and Automation (ENSA) describes the architecture, components, operations, and security to scale for large, complex networks, including wide area network (WAN) technologies. The course emphasizes network security concepts and introduces network virtualization and automation. Students learn how to configure, troubleshoot, and secure enterprise. Two hours lecture and two hours lab per week.

**Prereq.:** CSIS 3782.

**CSIS 3790 Undergraduate Research 1-3 s.h.**

A research experience under the supervision of a faculty mentor. Course may be repeated for a total of up to 6 semester hours.

**Prereq.:** CSIS 2605 or CSIS 2610, and faculty approval.

**CSIS 4819 Parallel and Distributed Computing 3 s.h.**

Survey of current development of parallel processing with emphasis on parallel programming. Topics include parallel architecture, interconnection networks for inter-processor communication, parallel sorting/searching algorithms, parallel constructs for parallel programming paradigms, and implementation of the algorithms in a parallel programming language.

**Prereq.:** CSIS 3700 and CSIS 3740.

**CSIS 4822 Database Applications 3 s.h.**

Design and development of applications using database languages.

**Prereq.:** CSIS 3722.

**CSIS 4823 Data Communications Networking 3 s.h.**

Study of present methods for design and evaluation of information networks, LAN and WAN. Includes queuing, routing, security, reliability, error detection and correction, and distributed processing.

**Prereq.:** CSIS 3723.

**CSIS 4831 Virtual Reality Systems 3 s.h.**

An investigation into the use, design, implementation, and evaluation of virtual reality interfaces. Experiences with VR systems using both 2D projections and stereoscopic display and other systems. Students work in multidisciplinary groups.

**Prereq.:** CSIS 3730.

**CSIS 4878 Mobile Application Development 3 s.h.**

Principles of designing and developing cross-platform mobile applications. Techniques for designing, developing, testing, packaging, and publishing cross-platform mobile apps. Client- and server-side programming theories and practices regarding mobile app development.

**Prereq.:** CSIS 3722, INFO 3776, and CSIS 3701.

**CSIS 4893 Computer Science and Information Systems Advanced Internship 2-4 s.h.**

An industrial/academic experience in information systems/technology. Employment for 15 to 20 hours per week. May be repeated once with the permission of internship supervisor.

**Prereq.:** 16 s.h. of department courses (at least 3 hours upper-division) and permission of department internship supervisor.

**CSIS 5824 Applied Artificial Intelligence 3 s.h.**

Study of artificial intelligence software related to decision making. Topics may include robotic control, expert systems, automated knowledge acquisition, or logic programming.

**Prereq.:** CSIS 3700 and 3 s.h. of upper-division departmental courses, or CSIS 6901.

**CSIS 5828 Computer Network Security 3 s.h.**

Overview of security issues that arise from computer networks, including the spectrum of security activities, methods, methodologies, and procedures. Intrusion detection, firewalls, threats and vulnerabilities, denial of service attacks, viruses and worms, encryption, and forensics.

**Prereq.:** CSIS 3723 or equivalent.

**CSIS 5837 Artificial Intelligence in Game Design 3 s.h.**

Artificial intelligence techniques for designing and programming intelligent non-player characters for a variety of different types of game genres. Finite and fuzzy state machines, terrain analysis and path planning, board games, language understanding, and learning.

**Prereq.:** CSIS 3700 or CSIS 3701 or CSIS 3726 or CSCI 6901.

**CSIS 5838 Graphics and Animation for Gaming 3 s.h.**

Design and implementation of 3D computer games. Development of 3D characters, including surface creation and effects, skeletal and facial rigging, and motion and animation. Programming those characters in a 3D game engine, including scripting, level and game design, and game physics.

**Prereq.:** CSIS 2605 or CSIS 2610 or CSIS 3737.

**CSIS 5883 Remote Access and Multilayer Switched Networks 4 s.h.**

Advanced WAN connectivity, including Frame Relay, ATM, ISDN, DSL, and modems; IP address scaling techniques; advanced access control; core issues in network design and management, focusing on multilayer switched networks and emerging multi-service networks. Will incorporate CCNP Cisco Academy curriculum. Three hours lecture, three hours lab.

**Prereq.:** CSIS 3783.

**CSIS 5884 Building Scalable Networks and Advanced Internetwork Troubleshooting 4 s.h.**

Designing scalable networks; advanced routing protocols; VLSM and route aggregation; management and diagnostic tools; troubleshooting tools and methodology for TCP/IP, Novell, and AppleTalk connectivity, VLANs, routers, and switches; Frame Relay and ISDN connectivity. Will incorporate CCNP Cisco Academy curriculum. Three hours lecture, three hours lab.

**Prereq.:** CSIS 3783.