

COSC 1301: Computers in Society [TCCN:COSC 1301]

A general introduction to computers and their applications with emphasis on breadth of coverage. Topics include computer system components, terminology, and use of productivity tools such as word processing, spreadsheets, database, and Internet usage. Case study analysis of the social impacts of computerization and networking. Topics include computer ethics, crime, privacy, security, reliability, and vulnerability. Not for CS/CIS credit. Offered in spring of odd years.

COSC 1307: Introduction to Information Systems Software [TCCN: BCIS 1305]

Students in this course will develop a proficiency in the use of the common applications of a productivity suite like Microsoft Office. Applications covered will include DOS, Windows, word-processing, spreadsheets, database, presentations, e-mail and the HTML editors. No prior computer experience is required. Offered in fall, spring, and summer.

COSC 1308: Introduction to Visual BASIC

This course introduces the fundamental concepts of programming including data types, control structures, subprograms, arrays, and simple graphical user interfaces using the Visual BASIC language. Offered in fall of odd years, and spring of even years.

Note: Cannot be applied toward a CS/CIS degree.

COSC 1310: Advanced Information Systems Software

This course enables students to improve their skills as knowledge workers. The emphasis is on personal productivity concepts through use of advanced features in computer software such as spreadsheets, databases, and presentation graphics. Offered every fall and summer. Prior knowledge of productivity software-databases, spreadsheets, and word processors-is strongly recommended.

COSC 1336: Programming Fundamentals [with COSC 1136=TCCN: COSC 1436]

Introduces the fundamental concepts of procedural programming. Topics include data types, control structures, functions, arrays, files, secure programming, and the mechanics of running, testing, and debugging. The course also offers an introduction to the historical and social context of computing and an overview of computer science as a discipline. Offered every fall, spring and summer. Concurrent enrollment in COSC 1136 required.

COSC 1136: Programming Fundamentals Laboratory

Laboratory sessions dealing with the fundamental concepts of procedural programming. Topics include data types, control structures, functions, arrays, files, secure programming, and the mechanics of running, testing, and debugging. Offered every fall, spring and summer. Concurrent enrollment in COSC 1336 required.

COSC 1337: The Object-Oriented Paradigm [with COSC 1137=TCCN: COSC 1437]

Introduces the concepts of object-oriented programming to students with a background in the procedural paradigm. Topics covered include a review of control structures and

data types, the object-oriented programming paradigm, object-oriented design, an overview of programming language principles, simple analysis of algorithms, basic searching and sorting techniques, secure programming techniques, and an introduction to software engineering issues. Offered every fall, spring and summer. Concurrent enrollment in COSC 1137 required.

Prerequisites: COSC 1336/1136.

COSC 1137: The Object-Oriented Paradigm Laboratory

Experiments with software development for topics such as control structures and data types, the object-oriented programming paradigm, object-oriented design, an overview of programming language principles, simple analysis of algorithms, basic searching and sorting techniques, secure programming techniques, and an introduction to software engineering issues. Offered every fall, spring and summer. Concurrent enrollment in COSC 1337 required.

COSC 2315: Computer Organization Introduces the concept of computers and information systems by presenting the process of computation as a hierarchy of virtual machines, beginning with the hardware and moving upward through various levels of increasingly sophisticated software. Offered every spring.

Prerequisites: COSC 1336/1136, MATH 1314, 1324 or 2330.

COSC 2325: Foundations of Computer Information Systems

This course provides a thorough introduction to graphical user interface programming using visual programming tools. After this course students will be proficient in developing Windows programs. Offered every fall and spring.

Prerequisites: COSC 1310, COSC 1336/1136.

COSC 2336: Data Structures and Algorithms [TCCN: COSC 2336]

Topics include recursion, the underlying philosophy of object-oriented programming, fundamental data structures (including stacks, queues, linked lists, hash tables, trees, and graphs), secure programming techniques, the basics of algorithmic analysis, and an introduction to the principles of language translation. Offered every fall, spring and summer.

Prerequisites: MATH 2330, COSC 1337/1137.

COSC 3191, 3192, 3193: Computer Science Co-Op I, II, III

Once a student has been approved for the co-op program, students can sign up for the appropriate co-op course (3191 for the first semester, 3192 for the second semester, 3193 for the third semester) with the approval of the chair of computer science. A student will hold a full-time computer or information technology position for the entire semester of the co-op. During the semester of a co-op course a student will submit biweekly status reports and, in collaboration with the employer, submit at the end of the semester a performance appraisal/ evaluation by the employer. Graded on a credit/no credit basis.

Prerequisites: COSC 1336/1136, COSC 1337/1137, and permission of the chair of the Department of Computer Science.

+COSC 3310: Internet and Web Applications

This course includes a detailed coverage of Internet protocols, Web site management, Web page design and e-commerce. The course examines the linkage of organizational strategy and electronic methods of delivering products and services in inter-organizational, national, and global environments. Offered every spring and summer.

Prerequisite: COSC 2325.

COSC 3315: Social and Professional Issues in Computing

Introduction to the social and professional issues that arise in the context of computing. Offered every fall.

Prerequisites: COSC 1337/1137.

COSC 3325: Algorithm Design and Analysis

Introduction to formal techniques used to support the design and analysis of algorithms, focusing on both the underlying mathematical theory and practical considerations of efficiency. Topics include asymptotic complexity bounds, techniques of analysis, algorithmic strategies, and an introduction to automata theory and its application to language translation. Offered every fall.

Prerequisite: COSC 2336.

COSC 3331: E-Commerce Programming

The course deals with the technical aspects of e-commerce. Students will learn to design, build, and maintain a complete e-commerce website. Topics include: e-commerce modeling, designing, and implementing a website that meets user requirements, maintaining and setting web servers, multi-tiered web architecture, database servers, accessing remote databases, shopping cart fundamentals, commerce server, advertising on the web, e-cash and electronic payments, and Internet Security and encryption. Students will build their own projects. Offered in spring of even years.

Prerequisite: COSC 3310.

COSC 3345: Computer Architecture

Introduces students to the organization and architecture of computer systems, beginning with the standard von Neumann model and then moving forward to more recent architectural concepts. Offered every fall. Concurrent enrollment in COSC 3145 required.

Prerequisite: COSC 2336 and COSC 2315.

COSC 3145: Computer Architecture Laboratory

Experiments in digital systems and computer architecture. Students will build and test logic circuits such as an adder, a multiplexer, arithmetic and logic unit, a counter, a shift register, and a memory unit. Students will also study hardware subsystems of a computer such as buses, central processing unit (CPU), and input/output systems. Offered every fall. Concurrent enrollment in COSC 3345 required.

COSC 3355: Operating Systems

Fundamentals of operating systems design and implementation. Topics include an overview of the components of an operating system, mutual exclusion and synchronization, implementation of processes, scheduling algorithms, memory management, operating system security, and file systems. Offered every spring.

Prerequisites: COSC 3345/3145.

COSC 3365: Programming with Data, File and Object Structures

This course covers computer concepts, algorithm development, programming and program validation. It includes a special emphasis on the design and application of data and file structures. Offered every fall.

Prerequisite: COSC 2325.

COSC 3375: Analysis and Logical Design

This course introduces the systems development process. Topics covered include structured and object-oriented analysis and design, use of modeling tools and the methodological life cycle and project management. It includes the study of interpersonal skill development with clients, users, team members, and others associated with the development, operation and maintenance of systems. Offered every fall.

Prerequisite: COSC 2325.

COSC 3385: Database Design

This course covers information systems design and implementation within a database management system environment. Students will design and construct a system using database software to implement the logical design. Offered every spring.

Prerequisites: COSC 3365 and COSC 3375.

COSC 4309: Design of Modern Information Systems

Introduction to prototyping and computer-aided software engineering. This course will provide a detailed study of advanced topics in information systems software including system libraries, database design, and distributed software. A complete information system will be developed from various software components.

Offered every fall.

Prerequisites: COSC 3310, COSC 1337/1137, COSC 3385.

COSC 4315: Information and Knowledge Management

The investigation of how information is a unifying theme within a range of issues in computer science, including database systems, artificial intelligence, human-computer interaction, multimedia systems, and data communication. Offered every fall.

Prerequisite: COSC 2336.

COSC 4325: Data Communications and Computer Networks

Study of problems and limitations associated with interconnecting computers by communication networks. OSI reference model, architecture of circuits, message and packet switching networks, network topology, routing, flow control, capacity assignments, protocols, coding and multiplexing. Offered every fall.

Prerequisite: COSC 2315.

COSC 4327: UNIX Shell Programming

Introduction to programming in the UNIX Shell; directory structure and file manipulation, built-in functions, control structures, utilities, and sublanguages. Offered in spring of odd years.

Prerequisite: COSC 2336.

COSC 4335: Artificial Intelligence

Survey of current artificial intelligence technologies: game playing, theorem proving, pattern recognition, searching algorithms, knowledge representation, neural networks, fuzzy systems, and heuristic programming. Offered in fall of even years.

Prerequisite: COSC 2336.

COSC 4336: Software Development

Provides an intensive, implementation-oriented introduction to the software-development techniques used to create medium-scale interactive applications, focusing on the use of large object-oriented libraries to create well-designed graphical user interfaces. Topics include event-driven programming, computer graphics, human-computer interaction (HCI), and graphical user interfaces. Offered every spring.

Prerequisite: COSC 2336.

COSC 4340: Comparative Study of Programming Languages

Introduction, analysis, and evaluation of the important concepts found in a variety of programming language paradigms; formalisms useful in specifying language syntax and semantics; programming language paradigms including algorithmic, functional, logic, object-oriented, visual, etc. Offered in fall of odd years.

Prerequisite: COSC 2336.

COSC 4345: Computer Graphics

Graphics hardware, software, and applications. Data structures for graphics, graphic languages, computer-aided design, and three-dimensional graphics. Offered in spring of even years.

Prerequisite: COSC 2336.

COSC 4352: Data Mining

The course deals with knowledge discovery from databases (KDD). Topics covered in the course include data warehouse, model fitting, classification, prediction, clustering, market basket analysis, extracting knowledge from data models, and data visualization techniques. Offered in fall of odd years.

Prerequisite: COSC 2336.

COSC 4356: Computer Vision

The course deals with extracting meaningful descriptions of physical objects from images. Topics covered include computer vision fundamentals, preprocessing techniques, feature extraction, supervised classifiers, unsupervised classifiers, and

computer vision applications. Offered in fall of even years.

Prerequisite: COSC 2336.

COSC 4360: Net-Centric Computing

Introduces the structure, implementation, and theoretical underpinnings of computer networking and the applications that have been enabled by that technology. Offered every fall.

Prerequisite: COSC 3355.

COSC 4361: Computer Security Management

This course will cover the techniques used to secure and manage computers, computer networks and enterprise computer systems. Topics covered will include security policies, computer network management, and disaster recovery. Special emphasis will be given to designing, deploying and managing complete security systems. Offered in spring of odd years.

Prerequisite: COSC 2315.

COSC 4362: Computer Security

This course will give a complete coverage of cryptography, network protocols and their use in computer security. This will include an overview of symmetric and asymmetric cryptographic algorithms and their use for authentication, e-mail and e-commerce. Network security protocols covered will include Kerberos, SET and SMIME. Offered in spring of even years.

Prerequisites: COSC 2336, and COSC 4360 or COSC 4325.

COSC 4370: Undergraduate Internship Program

An 8- to 16-week program providing a new learning experience in a computer or information technology environment. A written report describing the activities and accomplishments of the student during the internship is required at the conclusion of the internship period. May be repeated once for credit. A maximum of three credit hours may be applied toward the undergraduate degree. Offered every fall, spring and summer. **CR/NC only.**

Prerequisites: COSC 1337/1137.

COSC 4375: Information Systems Design Project

An integrated perspective of the problems in today's information systems environment, concentration on contemporary design, methodologies, and considerations unique to users of computers and information systems. Offered every fall.

Prerequisites: GENB 3301 or COSC 3315, COSC1337/1137, COSC 3385.

COSC 4377: Compiler Techniques

Characteristics of the compiling process, syntax directed compiling, symbol table construction and searching, top down and bottom up methods, formal grammars, and a formalization of syntax. Offered in spring of even years.

Prerequisites: COSC 2315 and COSC 2336.

COSC 4381: Seminar in Computer Science

This course is designed to study current trends in computer science. Offered spring of odd years.

Prerequisite: Senior classification in computer science.

COSC 4385: Database Management Concepts

Database system architecture; file structures for databases, including indexing, hashing, and B+ trees, the relational model and algebra; the SQL database language; alternative database systems (network, hierarchical, object-oriented, object-relational, logical implementation, temporal, etc.), conceptual data modeling including Entity-Relationship data modeling; advanced data modeling concepts; functional dependencies, basic normalization, and database security management. Offered every fall.

Prerequisite: COSC 2336.

COSC 4387: Computer Performance Evaluation

Discrete and continuous simulation of dynamic systems. Topics include: simulation of probabilistic systems; mathematical models of real systems; system classifications; random number generators; simulation languages; single queue and queue networks. Workloads, benchmarks, performance measurement techniques, and case studies will be used in system capacity planning, hardware selection and upgrade, and performance tuning. Offered spring of odd years.

Prerequisites: COSC 2336, COSC 3345/3145.

COSC 4199 - 4399: Independent Study

Independent study in specific areas of computer science not covered by organized undergraduate courses. A maximum of six credit hours for independent study courses may be applied toward an undergraduate degree. Offered every fall, spring, and summer. **Prerequisite:** Consent of department chair.

COSC 4395: Capstone Project

This course offers students the opportunity to integrate their knowledge of the undergraduate computer science curriculum by implementing a significant software system as part of a programming team. Offered every spring. **Prerequisites:** COSC 3315, COSC 3325, COSC 4315, COSC 4336, COSC 4360, COSC 4385.