

COURSE DESCRIPTIONS

[Contract All Courses](#) |

Credit designation at right of title is expressed in (c) class hours per week, (l) lab or (d) discussion section hours per week, and (cr) number of credits per semester.

Computer Science

COSC 101 - Computer Literacy

Class Hours: 3

Lab/Discussion: 0

Credits: 3

An introductory course providing fundamental understanding of computers. Familiarizes students with the interaction of computer hardware and software. Emphasizes the application of microcomputers, the use of productivity software (word processing, spreadsheet management, file and database management, presentation graphics, web browsers, search strategies, and e-mail), and the social and ethical aspects of the impact of computers on society. (Does not count toward computer science major.) Note: cross-listed as BTED/[IFMG 101](#)

. Any of these courses may be substituted for each other and may be used interchangeably for D/F repeats but may not be counted for duplicate credit.

COSC 105 - Fundamentals of Computer Science

Class Hours: 3

Lab/Discussion: 0

Credits: 3

The first course for computer science majors. Required of all computer science students; appropriate for other Natural Sciences and Mathematics students. Topics include the fundamental concepts of computer architecture, algorithm development and analysis, programming languages, software engineering, data organization and representation, and systems software. A hands-on introduction to computer usage with an emphasis on terminology and the underlying connections within the discipline.

COSC 108 - Introduction to Programming via Alice

Class Hours: 3

Lab/Discussion: 0

Credits: 3

An introduction to the development of algorithmic solutions to a variety of problems and the development of computer programs to implement the solutions. The Alice programming language and interactive development environment is incorporated to introduce fundamental algorithmic/programming concepts including variables, assignments, conditionals, loops, functions, and arrays through an

interactive movie animation paradigm. These concepts are then applied to a standard programming language. Includes an introduction to the Java programming language. (May not receive credit for both COSC 108 and [COSC 110](#).)

COSC 110 - Problem Solving and Structured Programming

Class Hours: 3

Lab/Discussion: 0

Credits: 3

An introduction to the development of algorithmic solutions to a variety of problems and the development of computer programs to implement the solutions. Explores standard programming structures used to introduce fundamental algorithmic/programming concepts including variables, assignments, conditionals, loops, functions, and arrays and their role in problems solving. Emphasizes structured programming in the development of algorithm solutions to common problems. Object-oriented paradigm is introduced at a basic level.

COSC 143 - Cyber Wellness

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Investigates the different categories of cyber wellness and how they affect emotional, physical, social, and intellectual wellness. Focuses on demonstrating intellectual agility and creativity in order to maintain physical wellness while using technology. Examines the effect technological changes have had on various disciplines and their impacts on society in relation to health and wellness. Discusses theories and principles related to the physical, mental, social, and emotional aspects of personal computer usage including cyberspace. Completion of COSC 143 fulfills the Liberal Studies Dimensions of Wellness requirement. Other 143 courses will also fulfill this requirement, and any of these courses may be substituted for each other and may be used interchangeably for D/F repeats but may not be counted for duplicate credit.

COSC 201 - Internet and Multimedia

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: BTED/[COSC 101](#)

[/IFMG 101](#)

or prior exposure to word processing and electronic mail

Focuses on the evaluation of information and multimedia resources available on electronic networks when doing research in an area of one's choice. An information literacy course for students to gain a more in-depth understanding of the information resources available electronically and of how to utilize them more effectively in communicating. Students learn how to access and utilize these resources for two-way communications and support for decision making while incorporating selected elements in multimedia presentations of their own design. (BTED/[COMM 201](#)

[/COSC/IFMG/LIBR 201](#)

may be used interchangeably for D/F repeats and may not be counted for duplicate credit.)

COSC 210 - Object-Oriented and GUI Programming

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: [COSC 108](#)

or [COSC 110](#)

An in-depth introduction to the Object-Oriented Programming (OOP) paradigm, including encapsulation, inheritance, and polymorphism. Focuses on designing, implementing, and using objects. Includes an introduction to Graphical User Interface (GUI) design and programming.

COSC 216 - Introduction to Cyber Security

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: [COSC 110](#)

Introduces the fundamental theory and concepts for cybersecurity including security principles, ethical and professional issues in cybersecurity, attack strategies, risk management, access control, integrity management, cryptography basics, security protocols, and strategies for defending computers and networks. Includes practical hands-on learning activities to enhance understanding and to apply the theory and concepts.

COSC 220 - Enterprise Computing

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: [COSC 110](#)

Introduces the use of mainframe computers in the development of enterprise computing applications. Includes mainframe programming language such as COBOL, program design using top-down techniques, program and project documentation, sequential and random file algorithms, integrated file systems, and features of enterprise computing such as data transfer formats.

COSC 281 - Special Topics

Class Hours: var

Credits: 1-3

Prerequisite: As appropriate to course content

Offered on an experimental or temporary basis to explore topics not included in the established curriculum. A given topic may be offered under any special topic identity no more than three times. Special topics numbered 281 are offered primarily for lower-level undergraduate students.

COSC 300 - Computer Organization and Assembly Language

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: [COSC 110](#)

or equivalent

A discussion of the basic computer architecture elements: gates, combinational and sequential logic, hardware arithmetic, CPU, and memory structure. An examination of the languages of machines: representation of data, addressing techniques, symbolic coding, assembly, and linking. Problem solving using assembly language.

COSC 310 - Data Structures and Algorithms

Class Hours: 3
Lab/Discussion: 0
Credits: 3

Prerequisite: [COSC 210](#)

Fundamental concepts of data design and implementation, data abstraction, data structures, arrays, linked-lists, stacks, queues, recursion, trees, graphs, and hashing. Also covers sorting algorithms, divide and conquer techniques, greedy methods, and analysis of algorithms. The object-oriented paradigm is employed using an object-oriented language.

COSC 319 - Software Engineering Concepts

Class Hours: 3
Lab/Discussion: 0
Credits: 3

Prerequisite: [COSC 310](#)
or instructor permission

Software engineering concepts include the collection of tools, procedures, methodologies, and accumulated knowledge about the development and maintenance of software-based systems. Strongly suggested for any student planning to take an internship in computer science. After an overview of the phases of the software life cycle, current methodologies, tools, and techniques being applied to each phase are discussed in depth with localized exercises given to reinforce learning of concepts.

COSC 341 - Introduction to Database Management Systems

Class Hours: 3
Lab/Discussion: 0
Credits: 3

Prerequisite: [COSC 110](#)
, [COSC 210](#)

Provides fundamental knowledge of, and practical experience with, database concepts. Includes study of information concepts and the realization of those concepts using the relational data model. Practical experience gained in designing and constructing data models and using SQL to interface to both multiuser DBMS packages and to desktop DBMS packages.

COSC 343 - Introduction to Numerical Methods

Class Hours: 3
Lab/Discussion: 0
Credits: 3

Prerequisite: [COSC 110](#)
, [MATH 121](#)
or [MATH 125](#)

Algorithmic methods for function evaluation, roots of equations, solutions to systems of linear equations, function interpolation, numerical differentiation, and integration and use of spline functions for curve fitting. The focus is on managing and measuring errors in computation. Also offered as [MATH 343](#)

; either COSC 343 or [MATH 343](#).

may be substituted for the other and may be used interchangeably for D/F repeats but may not be counted for duplicate credit.

COSC 345 - Computer Networks

Class Hours: 3
Lab/Discussion: 0
Credits: 3

Prerequisite: [COSC 110](#)
; [MATH 121](#)
or [MATH 125](#)
; and [MATH 214](#)
or [MATH 216](#)
or [MATH 217](#)
; or equivalents

Covers data communications, computer network architectures, functions of various network layers, communication protocols, internetworking, emerging high-speed networks.

COSC 352 - LAN Design and Installation

Class Hours: 3
Lab/Discussion: 0
Credits: 3

Prerequisite: BTST 273 or [IFMG 250](#)
or [COSC 108](#)
or [COSC 110](#)

A study of fundamental local area networking concepts. A detailed study of the basics of local area network (LAN) technology. A comparative study of commercially available LAN systems and products. Features a hands-on laboratory implementation of a LAN. Cross-listed as [IFMG 352](#).
. Either course may be substituted for the other for D/F repeats but may not be taken for duplicate credit.

COSC 355 - Computer Graphics

Class Hours: 3
Lab/Discussion: 0
Credits: 3

Prerequisite: Grade of "C" or better in [COSC 310](#)
and junior status

Introduces computer graphics hardware and software. Explores and implements 2-D and 3-D modeling and transformations, viewing transformations, projections, rendering techniques, lighting, and shading using a current cross-platform 3-D graphics API. Includes creation of complex, photorealistic images, and animation principles.

COSC 356 - Network Security

Class Hours: 3
Lab/Discussion: 0
Credits: 3

Prerequisite: [COSC 216](#)
and either [COSC 345](#)
or [COSC 352](#)
/[IFMG 352](#)

Explores mechanisms for protecting networks against attacks. Emphasizes network security applications that are used on the Internet and for corporate networks. Investigates various networking security standards and studies methods for enforcing and enhancing those standards.

COSC 362 - Unix Systems

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: [COSC 310](#)

or instructor permission

An introduction to the features, syntax, applications, and history of Unix. Coverage includes utilities, system administration, development environments, and networking concerns including distributed systems, client-server computing, and providing Web services.

COSC 365 - Web Application Development

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: [COSC 310](#)

and [COSC 341](#)

Covers the fundamental architecture of web-based applications. Presents client-side application development using markup languages such as XHTML/CSS, forms, scripting languages such as JavaScript and PHP, asynchronous updating of data such as AJAX, database access using SQL. Projects include development of distributed applications on the Internet. Includes best practices in usability, internationalization, security, and W3C accessibility standards for web applications.

COSC 380 - Seminar on the Computer Profession and Ethics

Class Hours: 2

Lab/Discussion: 0

Credits: 2

Prerequisite: Instructor permission

Reading, review, and discussion of the current literature of computer science and industry trade journals; effective oral presentations; employment prospects. Topics on computer ethics and review of case studies on computer ethics from professional journals with discussion of the issues involved. Should be taken the semester before an internship or the first semester of the senior year. Should not be taken at the same time as [COSC 480](#).

COSC 405 - Artificial Intelligence

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: Grade of "C" or better in [COSC 310](#)

Introduces the field of artificial intelligence. Explores and implements solutions using classical and modern artificial intelligence techniques. Includes state space search, logical inference, expert systems, optimization, knowledge representation, machine learning, handling uncertainty, and soft computing.

COSC 410 - Computer Architecture

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: [COSC 300](#)
, [COSC 310](#)

Introduces the underlying working principles of electronic computers. Discusses the organization and architecture of computer components. Expounds on details of memory hierarchy, I/O organization, computer arithmetic, processor and control unit design, instruction set architecture, instruction-level parallelism, and the ways functional components interact together.

COSC 420 - Modern Programming Languages

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: [COSC 310](#)

A comparative survey of programming language paradigms. Includes an examination of the properties, applications, syntax, and semantics of selected object-oriented, functional, and declarative programming languages.

COSC 424 - Compiler Construction

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: [COSC 300](#)
, [COSC 310](#)

Relates the formal concepts of automata and language theory to the practicality of constructing a high-level language translator. The structures and techniques used in lexical analysis, parsing, syntax-directed translation, intermediate and object code generation, and optimization are emphasized.

COSC 427 - Introduction to Cryptography

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: [COSC 310](#)
and [MATH 309](#)

Fundamental concepts of encoding and/or encrypting information, cryptographic protocols and techniques, various cryptographic algorithms, and security of information are covered in depth.

COSC 429 - Digital Forensics

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: [COSC 110](#)

or equivalent programming course, junior standing or instructor permission

Takes a detailed, hands-on approach to the use of computer technology in investigating computer crime. From network security breaches to child pornography, the common bridge is the demonstration that particular electronic media contains incriminating evidence. Using modern forensic tools and techniques, students learn how to conduct a structured investigative process to determine exactly what happened and who was responsible, and to perform this investigation in such a way that the results are useful in criminal proceedings. Real-world case studies are used to provide a better understanding of security issues. Unique forensics issues associated with various operating systems including Linux/Windows operating systems and associated applications are covered.

COSEC 430 - Introduction to Systems Programming

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: Grade of "C" or better in [COSEC 300](#)

and [COSEC 310](#)

or instructor permission

An in-depth introduction to a systems programming, system programming language(s) and application of those language(s) to systems-level problems. The focus is on programming constructs that are closely aligned with the architecture of a digital computer including those providing portability between platforms, dynamic allocation and management of virtual memory, complex in-memory data structures, reading/writing binary data using sequential and random access, pointer arithmetic/manipulation, and interaction between threads/processes.

COSEC 432 - Introduction to Operating Systems

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: [COSEC 300](#)

, [COSEC 310](#)

or equivalents

Introduces the principles of operating system design and implementation. Includes interrupt services, process states and transitions, threads, scheduling algorithms, synchronization tools, deadlocks, virtualization, memory management of (main and virtual), storage devices management, file systems, and operating systems security.

COSEC 454 - Information Assurance Administration

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: [COSEC 216](#)

or instructor permission

Explores the various issues pertinent to maintaining acceptable levels of information security within organizations. Addresses issues involved in administering and managing information security systems. Intended to raise awareness of information security issues across organizations.

COSEC 460 - Theory of Computation

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: [COSC 310](#)

or instructor permission

Formal methods for describing and analyzing programming languages and algorithms. Covers Backus-Naur forms, productions, regular expressions, introduction to automata theory, Turing machines, and recent concepts in algorithm theory computability.

COSC 465 - Distributed Processing and Web Services

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: [COSC 365](#)

or [COSC 310](#)

and instructor permission

An advanced study into architecture of Internet systems and the process of developing distributed computer applications running on the Internet and/or other networks. Presents an in-depth understanding of distributed processing technologies including socket programming, RPC, RMI, EJBs, DCOM, .NET, SOAP, and Web services. Emphasis is placed on the use of XML to support multi-party heterogeneous distributed applications and includes XML fundamentals (e.g., DTDs, XML schemas, XPath, XSLT, SAX, and DOM), and Web services (e.g., SOAP, WSDL, UDDI, and ebXML). Students complete hands-on projects utilizing mentioned technologies.

COSC 473 - Software Engineering Practice

Class Hours: 3

Lab/Discussion: 0

Credits: 3

Prerequisite: [COSC 319](#)

or instructor permission

Planning, design, and implementation of large software systems using software engineering techniques. Students work on project teams on real or realistic software development projects. Credit for either COSC 473 or [COSC 493](#), but not both, may count toward computer science major requirements for graduation; the other course credits will be counted as free electives.

COSC 480 - Seminar on Technical Topics

Class Hours: 0

Lab/Discussion: 1

Credits: 1

Prerequisite: See text below

Reading, review, and discussion of the current literature of computer science and industry professional and technical journals; oral presentations. Should be taken the last semester of the senior year. Should not be taken at the same time as [COSC 380](#).

COSC 482 - Independent Study

Class Hours: var

Credits: 1-4

Prerequisite: Prior approval through advisor, faculty member, department chairperson, dean, and Office of the Provost

Students with interest in independent study of a topic not offered in the curriculum may propose a plan of study in conjunction with a faculty member. Approval based on academic appropriateness and availability of resources.

COSC 493 - Internship in Computer Science

Class Hours: var

Credits: 6-12

Prerequisite: Junior standing and department permission

Provides on-the-job experience in computer science with private and government employers. Requirements include periodic consultation with a faculty member and employer evaluations. Requires completion of related academic work in the form of progress reports, final report, and oral presentation. Internship is either 6 credit hours over a minimum of 12 weeks or 12 credit hours over a minimum of 23 weeks. The 6cr option may be taken twice. (Writing-intensive course. As such, internship requires completion of designated writing-intensive components.)