



**KENTUCKY STATE  
UNIVERSITY**

## COMPUTER SCIENCE (COS)

### **COS 100: Intro to Computers**

Introductory survey of the concepts and terminology of computer hardware and software integrated with significant computer laboratory experience. Includes hardware organization, operating systems, and skill development projects in commonly used Productivity Software.

**Credit Hours:** 3

**Contact Hours:** 3

### **COS 101: Prog Visual Basic**

An introduction to structured programming using Visual BASIC as a programming language. Focus on problem-solving techniques using basic file handling routines, mathematical computation, string handling, decision and repetition structures.

**Credit Hours:** 3

**Contact Hours:** 3

### **COS 107: Prob Solving, Logic & Design**

A language-independent introduction to program development using various problem-solving techniques. Emphasis is placed on problem analysis, algorithm and pseudocode development, as well as various data and control structures.

**Credit Hours:** 3

**Contact Hours:** 3

### **COS 108: Prin Computer Science I**

An introduction to the foundations of Computer Science that incorporates the study of computer architecture, data representation, organization and storage, algorithm development and structured programming using C++ as a design tool.

**Prerequisite:** COS 107, ENG 101 and MAT 111 or consent of divisional chair

**Credit Hours:** 4

**Contact Hours:** 4

### **COS 109: Prin Computer Sci II**

A continuation of COS 108 with an extensive study of the manipulation of arrays, strings, record structure and files. A brief introduction to Object Oriented Programming is provided.

**Prerequisite:** COS 108

**Credit Hours:** 4

**Contact Hours:** 4

### **COS 120: Microsoft Office Publisher**

Introductory coverage of the Microsoft Office Publisher. Learn how to create a publication from scratch or use one of the hundreds of business and personal designs available in Publisher.

**Credit Hours:** 1

**Contact Hours:** 1

### **COS 121: Computer Concepts**

This computer literacy course introduces computer terminology about computer hardware, software and various areas related to computers such as Email, Internet, World Wide Web, networking, input, output and storage devices

**Credit Hours:** 1

**Contact Hours:** 1

### **COS 122: Intro to Operating Systems**

Introducing Windows, the operating system and commands. Learning customizing the user interface, adding and deleting hardware, installing software, managing folders, files and disks, shortcuts, properties, and using Control Panel.

**Credit Hours:** 1

**Contact Hours:** 1

### **COS 123: Introduction to Word**

Creating simple documents with editing commands, and preparing professional documents, reports, flyers, and posters. Learning to manage tables, indexes, cross references, newspaper columns, merge mail, label/envelop printing, macros, and more.

**Credit Hours:** 1

**Contact Hours:** 1

### **COS 124: Introduction to Excel**

Creating simple spreadsheets and applying math, statistical, financial, and database functions with various built-in commands. Learning to draw and interpret pie, line, bar, and stacked graph charts. Learning how to make macros.

**Credit Hours:** 1

**Contact Hours:** 1

### **COS 125: Introduction to Access**

Learning to use a database management system (DBMS) for creating, reading, updating and deleting data. Experiencing formatting, sorting, finding records using search tools, generating reports, securing data, along with other database application features

**Credit Hours:** 1

**Contact Hours:** 1

### **COS 126: Introduction to PowerPoint**

Creating on-screen presentations. Learning how to produce informative, attractive, effective presentations using features of this software application.

**Credit Hours:** 1

**Contact Hours:** 1

### **COS 127: Intro to Web Design Using HTML**

Learning about various HTML tags and their use for creating simple, attractive web pages. The pages can contain animation, graphics, audio/video, and script programs.

**Credit Hours:** 1

**Contact Hours:** 1

### **COS 129: Introduction to JavaScripts**

Create applets using JavaScript and design professional looking web pages with executing code embedded.

**Credit Hours:** 1

**Contact Hours:** 1

### **COS 130: Special Topics Lab**

This laboratory course will have changing topics from computer science to provide knowledge in a new area of this fast changing field. May be repeated for credit 3 times with different topics.

**Credit Hours:** 0

**Contact Hours:** 1

**COS 170: Networking Fundamentals**

This course deals with principles and practices in networking. It will involve an overview of networking and computer components employed in transmission of data in local and wide area networks. The basics of networking media, devices, protocols, layered communications models and network addressing are some of the topics to be covered.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 180: Advanced Prog - Visual BASIC**

A continuation of COS 101. The course includes topics such as table handling, advanced string manipulation, file processing, sorting, and search routines in Visual BASIC.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 200: Computer Information Systems**

Overview of computer-based information systems, major models, applications and functions from a component perspective. Learn to describe physical and logical aspects of systems. Learn to present related material with intermediate HTML.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 214: Network Protocols**

**Credit Hours:** 3

**Contact Hours:** 3

**COS 232: Programming I**

Required for Business and Security options. This course is a study of COBOL syntax, constructs, and its applications in business programming. Topics include structured program design, control break processing, table usage, sorting, merging, report writing, and maintenance of sequential, indexed and relative files.

**Prerequisite:** COS 101 or 108

**Credit Hours:** 4

**Contact Hours:** 4

**COS 260: Mobile Security**

This course focuses on the growing threats to wireless devices, networks and services delivered over the mobile infrastructure. This course provides an exploration into the unique challenges facing mobile security while comparing and contrasting it with what has been learned from computer and network security. This course provides a conceptual overview of the security principles incorporated in the design of generations of mobile networks, and platform models of the mobile devices.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 275: Game Programming Foundation I**

This course introduces students to the rigorous field of interactive simulation and gaming. Students learn about the major components of modern simulations and games from both a design perspective and a technical perspective. Topics covered include: fundamentals of simulation/gaming, user interface design, human computer interaction, input/output paradigms, and an overview of simulation/game design process. Lab activities are designed to foster critical thinking and problem solving skills through the development of an understanding of the development process as well as interactive programming techniques through the creation of working interactive programs in a high level programming language. Credit: 4 semester hours.

**Prerequisite:** COS 109

**Credit Hours:** 4

**Contact Hours:** 4

**COS 281: Introduction to Info. Sec. & A**

This course provides the foundation for understanding the key issues associated with protecting information asset, determining the levels of protection and response to security incidents, designing a consistent, reasonable information security system with appropriate intrusion detection and reporting features, and learning the principles of trusted computing bases (TCB). CREDIT: 3 SEMESTER HOURS.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 282: Intro to Cryptography**

This course provides a comprehensive foundation in the principles and practices of cryptography. This course covers the essential concepts, techniques, and applications of cryptographic methods to secure information in the digital age.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 297: Cybersecurity Apprenticeship**

**Credit Hours:** 12

**Contact Hours:** 12

**COS 300: System Design/Development**

A study of computer systems design and development techniques.

Includes the systems development cycle, requirements determination and analysis, specification development, Object-oriented (OOD) methods, system validation and verification, quality assurance and implementation.

**Prerequisite:** COS 109

**Credit Hours:** 3

**Contact Hours:** 3

**COS 301: Computer Organization**

A detailed study of the organization and structuring of a computer system. Topics include logical basis of computer structure, machine language, number systems, the mechanics of data transfer and control, and recent advances in computer organization.

**Prerequisite:** COS 109

**Credit Hours:** 4

**Contact Hours:** 4

**COS 302: Operating Systems**

An overview of the concepts and theories that underlie operating systems including: process and memory management strategies, file systems and protection, scheduling algorithms, multi-programming, distributed systems, and virtual memory.

**Prerequisite:** COS 301

**Credit Hours:** 3

**Contact Hours:** 3

**COS 303: Human Perspective on Computing**

This course focuses on the study of computing's interaction with human culture.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 310: Discrete Computing Structures**

Introduces mathematical topics needed in the study of Computer Science including logic, set theory, matrices, induction and recursion, discrete probability, relations, Graphs, Trees, etc..

**Prerequisite:** MAT 125

**Credit Hours:** 3

**Contact Hours:** 3

**COS 314: Network Protocols**

This course introduces students to network protocols, in particular the OSI and TCP/IP suite of network communication protocols. Topics include fundamentals of networks, data transmission, network architecture, protocols and others.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 330: Cloud Security**

This course provides a bottom up approach to the concepts of cloud landscape, architectural principles, techniques, design configurations and real-world best practices related to Cloud: service providers, consumers, and services. The course will define and delineate Cloud security architecture and explore the guiding security design principles, design patterns, industry standards, applied technologies and addressing regulatory compliance requirements critical to design, implement, deliver and manage secure cloud based services.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 331: Introduction to Robotics**

Introduction to robotics including the design, building, and programming simple robots. Included will be the basic science, engineering, and mathematics needed to design and build a simple robot. Students will also be introduced to the topic of project management. The course is a combination lecture/laboratory course that will meet five hours per week for three credit hours.

**Credit Hours:** 3

**Contact Hours:** 5

**COS 332: Management Information Security**

This course focuses on the managerial aspects of information security and assurances. Topics covered include access control models, information security governance, and information security program assessment and metrics. Coverage on the foundational and technical components of information security are included to reinforce key concepts. The course includes up-to-date information on changes in the field, such as national and international laws and international standards like the ISO 27000 series. Credit: 3 semester hours.

**Prerequisite:** COS 281

**Credit Hours:** 3

**Contact Hours:** 3

**COS 334: Computer Forensics**

This course will deal with an exciting area of computer forensics, crimes, law and investigations. Data are collected from cell phones, mobile devices documents, e-mail, etc., and evidence is collected by using various forensics tools. The pretrial and courtroom experiences of a computer forensics investigator will also be discussed. CREDIT: 4 SEMESTER HOURS.

**Prerequisite:** COS 281

**Credit Hours:** 4

**Contact Hours:** 4

**COS 340: Data Struc Algorithm Analy**

A more advanced study of the complex discrete data structures explored in COS 310. Algorithms manipulating these structures are implemented in C++; using Object Oriented Programming techniques.

**Prerequisite:** COS109 and 310

**Credit Hours:** 3

**Contact Hours:** 3

**COS 350: Organization Prog Lang**

A comparative analysis of programming language constructs used in major programming languages. Students study the historical development of programming languages, BNF context/free grammars, language evaluation criteria, and the implementation of data types, control structures, and operators.

**Prerequisite:** COS 109

**Credit Hours:** 3

**Contact Hours:** 3

**COS 364: Data Storage and Data Mining**

This course is an introduction to data warehouse design, modeling and data mining. It provides students with an understanding of the industry standard data mining methodologies, and with the ability of solving problems with it. CREDIT: 3 SEMESTER HOURS.

**Prerequisite:** COS 109

**Credit Hours:** 3

**Contact Hours:** 3

**COS 375: Game Programming Foundation II**

This course is a continuation of the Gaming I and students will learn to build on their previous knowledge. They will learn the advanced level material in such as Graphics, Sound and Animations. They will build professional looking user interfaces and will use GUI for interactive simulation and gaming. CREDIT: 3 SEMESTER HOURS.

**Prerequisite:** COS 275

**Credit Hours:** 3

**Contact Hours:** 3

**COS 385: Gaming and Computer Graphics**

Topics in two and three-dimensional graphics, along with a modern 3D graphics API. Introduction to the foundations of three-dimensional display: projections, geometric transformations, scan conversion, clipping, lighting, shading, and texturing. CREDIT: 4 SEMESTER HOURS.

**Prerequisite:** COS 275

**Credit Hours:** 4

**Contact Hours:** 4

**COS 399: Undergrad Teaching Experience**

Students earn course credit for undergraduate teaching experience including but not limited to (1) assisting students during laboratory sessions, (2) helping to set up laboratories or lecture/lab quizzes, or (3) conducting PLTL-Excel type workshops for students. Course may be repeated for credit.

**Prerequisite:** Consent of instructor

**Credit Hours:** 1

**Contact Hours:** 1

**COS 410: Database Management Systems**

Detailed study of major database concepts and dominant models. Focus on hierarchical, relational, and object—relational systems as they are implemented in current DBMS. Student teams design and build a DBMS.

**Prerequisite:** COS109

**Credit Hours:** 3

**Contact Hours:** 3

**COS 420: Algorithms**

Techniques of analyzing, developing, and implementing algorithms are presented. Examples of algorithms from sorting, set manipulation, and graphs; computational complexity and np/completeness are implemented in appropriate programming languages.

**Prerequisite:** COS 340

**Credit Hours:** 3

**Contact Hours:** 3

**COS 430: Application Security**

This course will focus on issues related to the design, testing, review and implementation of secure applications. Emphasis will be placed on writing software programs that make it difficult for intruders to exploit security holes.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 435: Advanced Topics in Cyber Secur**

An in- depth study of advanced topics in information security. Topics will vary according to current trends and research directions in the field. Some possible topics include: information security, managements, risk assessment, network security, and cyber- forensics. This course will provide most advanced knowledge in cyber security in line with some homeland security strategically research themes and current hard problems in INFOSEC. Research and knowledge, these include current hard problems in INFOSEC research. Credit: 3 semester hours.

**Prerequisite:** COS 281

**Credit Hours:** 3

**Contact Hours:** 3

**COS 460: Artificial Intelligence**

Introduces various topics related to the field of Artificial Intelligence including but not limited to logic, knowledge representation, expert systems, natural language processing, AI related problems, and AI languages.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 464: Mgt of Computer Info Systems**

This course provides a capstone course for students to integrate course experiences. Students will manage real Information System projects for businesses/organizations located in the community. Credit: 4 semester hours.

**Prerequisite:** COS 300 and COS 410

**Credit Hours:** 4

**Contact Hours:** 4

**COS 470: Networking/Telecommun**

Issues relating to network analysis and management are explored.

**Prerequisite:** COS 302 Overview of telecommunications systems and computer components employed in transmission of data in local and wide area networks

**Credit Hours:** 3

**Contact Hours:** 3

**COS 475: Game Design and Development**

This course involves the study of the technology, science and storytelling involved in the creation of computer games. It will emphasize hands-on development of games. Relevant software technologies including programming languages, and simulation engines will be discussed. We assume significant programming experience and knowledge of programming language concepts. We also assume student can learn new programming concepts and systems on their own (direct, OpenGL).

CREDIT: 3 SEMESTER HOURS

**Prerequisite:** COS/DGE 375

**Credit Hours:** 3

**Contact Hours:** 3

**COS 479: Found in Information Security**

This course introduces different concepts of Information Security. It provides a broad overview of the threats to the security of information systems, the responsibilities and basic tools for information security, and the levels of training and expertise needed in organizations to reach and maintain a state of acceptable security.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 480: Pene. Test & Vulner. Analysis**

This course focus is on in-depth methodologies, techniques, and tools used to identify vulnerabilities, exploit, and assess security risk to networks, operating systems, and applications. This course will allow the student to ethically think and work like a successful ethical penetration tester.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 481: Information Security**

This course will focus on the design principles of trusted computing bases (TCB). Issues regarding authentication; access control and authorization; discretionary and mandatory security policies; secure kernel design; secure operating systems; and secure databases.

**Prerequisite:** COS 302 or COS 479

**Credit Hours:** 3

**Contact Hours:** 3

**COS 482: Introduction to Cryptography**

This course provides the basics of cryptography and how it is used for Information Security.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 483: Database Security**

This course will focus on issues related to the design and implementation of secure data stores. Emphasis will be placed on multilevel security in database systems; covert channels; and security measures for relational and object-oriented database systems.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 484: Intro to Network Security**

This course introduces students to the fundamental techniques used in implementing secure network communication and gives them an understanding of common threats and attacks, as well as some practical experience in attacking and defending networked systems.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 485: Information Security Project**

Prerequisites or corequisites: three courses from COS 481-484. This project course integrates all of the knowledge accumulated in the previous security courses and will serve as a capstone course for the specialization in Information Security

**Credit Hours:** 3

**Contact Hours:** 3

**COS 490: Seminar in Computer Science**

Important and timely problems in Computer Science are reviewed to reinforce and integrate ideas presented over the curriculum. Advanced topics will be introduced.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 492: Interactive Gaming Project****Credit Hours:** 3**Contact Hours:** 3**COS 495: Interactive Gaming Project**

Prerequisite: COS/DGE 475. Interactive gaming puts into practice all of the information and knowledge gained in the previous courses. In this sequence the students first identify, then build, the necessary components for a full working 3D simulation/game engine. We assume significant programming experience and knowledge of programming language concepts. We also assume students can learn new programming concepts and systems on their own (direct, OpenGL).

**Credit Hours:** 3**Contact Hours:** 3**COS 496: Capstone Project**

The Capstone Project provides an opportunity for students close to graduating to participate at a high-level of inquiry-based and practice-centered learning focusing on their area of specialization. These projects aim to bridge theory and practice and are aimed to have an impact on the professional life of students after graduation.

**Credit Hours:** 3**Contact Hours:** 3**COS 497: Indep Study in Comp Science**

Research and in-depth study of a particular computer science topic or problem under the supervision of a Computer Science faculty member.

**Prerequisite:** senior classification and consent of instructor**Credit Hours:** 3**Contact Hours:** 3**COS 498: Internship in Computer Science**

This course can be taken for on- or off-campus employment related to the computer science discipline. The student must demonstrate that the experience gained on the job is at least equivalent to the material learned in a typical class. May be repeated once.

**Prerequisite:** junior or senior classification and consent of Computer Science chairperson**Credit Hours:** 3**Contact Hours:** 3**COS 499: Special Topics in Computer Sci**

This course may have a different topic relevant to the computer science field each time it is offered. The purpose of the course is to gain knowledge in current areas of this ever-changing field. The course may be repeated four times for credit.

**Prerequisite:** permission of the instructor**Credit Hours:** 3**Contact Hours:** 3