



**KENTUCKY STATE  
UNIVERSITY**

## COMPUTER SCIENCE (COS)

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### **COS 502: Computer Science Foundation I**

Problem analysis, top-down design and stepwise refinement. Programming languages concepts of input/output, data representation, data types, iteration, recursion, functions, and parameter passing, arrays, linked lists, binary trees, abstract data types, and traversal algorithms. Other topics are sorting, searching, and algorithm analysis.

**Credit Hours: 3**

**Contact Hours: 3**

### **COS 504: Computer Science Found II**

An introduction to the basic mathematical, theoretical subjects and tools needed for other courses in the program. The course covers different topics such as discrete mathematics, Boolean algebra, number theory, graph theory, trees, finite automata, and others.

**Credit Hours: 3**

**Contact Hours: 3**

### **COS 505: Computer Science Found III**

This course teaches students the skills in computer systems, operating systems, and basic components.

**Credit Hours: 3**

**Contact Hours: 3**

### **COS 506: Adv Programming/Data Structure**

This course teaches students the advanced skills in programming and data structures.

**Credit Hours: 3**

**Contact Hours: 3**

### **COS 511: WEB Programming**

To introduce the basic tools for Web programming using XML, ASP.NET, Visual Basic.NET, C and J.

**Credit Hours: 3**

**Contact Hours: 3**

### **COS 512: WEB Engineering**

To introduce basic ideas for Web engineering design methodologies. The course will use XML and ASP.

**Credit Hours: 3**

**Contact Hours: 3**

### **COS 513: Computer Graphics and GUI**

Presents the basic ideas from 2-D and 3-D graphics and the transformations algorithms from 2-D to 3-D. The second portion of the course serves to introduce the student to programming interactive 2-D graphical user interfaces.

**Credit Hours: 3**

**Contact Hours: 3**

### **COS 514: Database and Data Mining**

This course presents data mining from a database perspective. A study of methodologies and algorithms for extracting meaningful data from unstructured and structured data repositories. Topics will include data warehousing, clustering, classification, association rules mining, etc. for real-world problems.

**Credit Hours: 3**

**Contact Hours: 3**

### **COS 515: Adv Database Manage Systems**

Advanced topics in DBMS including distributed internet implementations. Thorough coverage of new structural and operational data models.

**Credit Hours: 3**

**Contact Hours: 3**

### **COS 516: Computer Vision**

The aim of this course is to give students a firm understanding of the theory underlying the processing and interpretation of visual information and the ability to apply the understanding in a wide variety of situations. Students who successfully complete this course will be well placed to pursue subsequent work either in research or in industry.

**Credit Hours: 3**

**Contact Hours: 3**

### **COS 517: E-Commerce**

A computer science-oriented approach is used to examine infrastructure, including functionality, usability, data design and strategic technical choices for typical types of e-commerce. A working prototype is required.

**Credit Hours: 3**

**Contact Hours: 3**

### **COS 518: Network and WEB Security**

The major tools for network security and Web security is presented as techniques of programming under network and web environments. Topics such as network security architectures; policy and legal issues; security assessment and incident handling; and tools used for network security are presented.

**Credit Hours: 3**

**Contact Hours: 3**

### **COS 519: Managing Info Technology**

This course provides an in-depth, real-world understanding of information systems technologies. It presents students with the importance of technology, system development, and functional transaction processing systems, and emphasizes the innovative uses of information technology throughout the enterprise essential in most aspects of today's professional careers.

**Credit Hours: 3**

**Contact Hours: 3**

### **COS 520: Multimedia Design**

This course covers intermediate techniques in multimedia systems for capturing, managing, accessing, and delivering digital media over network technology. It proves the structure and environment to design, develop, and deliver web-based multimedia projects.

**Credit Hours: 3**

**Contact Hours: 3**

### **COS 521: Web System Design**

This course focuses on the use of system engineering methodologies for designing, coding, and the deployment of web applications. This course will use current industry web technologies.

**Credit Hours: 3**

**Contact Hours: 3**

**COS 533: Cryptography Algorithms**

Students are introduced to the area of cryptography. This course covers intermediate concepts of cryptography, communication channels, encryption, attacks and others.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 535: Advanced Networking**

This course deals with concepts of modern computer and telecommunication networks. The introductory principles and advanced topics related to networking terminology, protocols, standards design, administration and maintenance will be covered.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 536: Software Engineering**

This course covers the concepts involved in software engineering related to software process, requirements engineering, design, architecture, quality, testing, and project management.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 537: Artificial Intelligence**

An intermediate study of various topics in the field of Artificial Intelligence. Topics may include logic programming, knowledge representation, expert systems, natural language processing, neural networks, robotics, machine learning, AI related problems and languages.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 541: Advanced Comp Architecture**

This course will discuss the advanced fundamentals of digital system and computer architecture. Advanced topics in the study of the computer architecture design for sequential and parallel systems, open system architecture, design principles, and ALU design will be presented.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 543: Numerical Methods/Application**

This course covers advanced numerical solutions and techniques such as large linear system problems, non-linear systems, elliptic, and parabolic PDEs.. Additional topics covered are numerical solutions from point of modeling large mathematical systems and application and simulations issues.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 544: Advanced Operating Systems**

This course will discuss the fundamentals of operating systems and advanced topics in distributed operating systems. It helps students become more aware of the concepts, trends, and tools available for operating systems.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 552: Storage Area Networks**

This course presents the benefits of storage area networks (SANS) to the corporate users and enables them to deploy SAN technology effectively. The course is designed as an introduction to SANs. The topics covered include topologies, protocols, and products required to implement and manage efficient SANS.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 553: Common Gateway Interface**

This course is an introduction to the Common Gateway Interface (CGI) and the design issues for running external programs, software, or gateways under an information server in a platform-independent manner.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 570: Adv Comp Architecture/Software**

Advanced topics on computer software and hardware systems are covered which involve controlling complexity; virtual memory, thread and coordination of parallel activities. It also discusses quantitative and qualitative understanding of superscalar, pipelined architecture and different operating systems.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 571: Software Assurance**

Students will learn advanced skills in software assurance. This course will also prepare students in methods to assure a level of confidence in software systems and develop expertise to assess the security capabilities and resiliency of the software.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 581: Advanced Crypto Algorithms**

Introduction to the advanced cryptography algorithms, block encryption algorithms, public key algorithms, digital signature algorithms, PKI key managements, authentication and implementation issues, protocols theory, protocol use, and protocol design theory.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 582: E-Commerce Security**

This course covers the topics related to secure electronic commerce technology: models and issues; related principles with case studies; security architectures; digital signatures; certificates; public key infrastructure (PKI); and legal and national policy on secure electronic commerce and others.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 583: Enterprise Secur Managements**

Students are introduced to the managerial aspects of computer security and risk management for enterprises. Also covered are accreditation; procurement; extension and operation principles for secure enterprise information systems; security policy; plan development; contingency, continuity and disaster recovery planning; and incident handling and response.

**Prerequisite:** COS 581 and 582

**Credit Hours:** 3

**Contact Hours:** 3

**COS 584: Secure Sys Admin/Certific**

This course deals with provisioning, procurement and installation of network hardware and software systems for mission critical enterprises. System configuration and maintenance, incident handling and response, system certification, and testing and validation will also be covered.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 585: Information Security**

This course introduces the basic notions of securing information which deals with authentication models, auditing, intrusion detection, operational security issues, physical security issues, security system life cycle management, and others.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 586: Information System Assurance**

This course deals with the in-depth study of the design and analysis of high assurance information systems. The topics include safety; reliability and security; specification of mission-critical system properties; software and hardware validation; and verification and certification.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 587: Database Security**

This course will focus on the issues related to the design and implementation of the secure data stores. Emphasis will be placed on multi-level security in database systems, covert channels, and security measures for database systems.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 588: Computer Network Security**

The course covers two major topics. Computer network protocols and service models, the OSI model, network architecture, and networked systems. The second part involves an examination of network security defense techniques and countermeasures. Topics include: firewall systems and IDS, VPNs, security threats, mechanisms, and services.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 589: Info Security Risk Analysis**

This course is an introduction to risk analysis for network and systems as well as the associated risks to assets and operations. Some of the topics are cost-effective risk analysis techniques to identify and quantify the treats, and qualitative risk analysis.

**Credit Hours:** 3

**Contact Hours:** 3

**COS 599: Special Topics in Technology**

A treatment of topics relevant to the computer security, networking, or information technology not routinely covered by other courses. New developments in systems concepts, techniques, and equipment. May be repeated up; to 2 times for credit.

**Prerequisite:** Permission of the instructor

**Credit Hours:** 3

**Contact Hours:** 3

**COS 600: Research Methodology**

This course is a prerequisite for project/thesis option. An introduction to the techniques and methodology used to conduct research. The successful students will be able to read and analyze technical papers. The students will utilize this experience in the project/thesis courses. in systems concepts, techniques, and equipment. May be repeated up; to 2 times for credit.

**Prerequisite:** Consent of the chairperson

**Credit Hours:** 3

**Contact Hours:** 3

**COS 682: Seminar on Mgt Info Sys**

Topics include: the use of computer hardware and software to retrieve data; manage databases; modeling alternatives; and preparing reports.

**Prerequisite:** Permission of the instructor

**Credit Hours:** 3

**Contact Hours:** 3

**COS 683: Decision Support Systems**

This course combines theory with the practical techniques of PERT, CPM, linear programming, modeling, "What If" analysis, break even analysis, and decision trees. aring reports.

**Prerequisite:** Permission of the instructor

**Credit Hours:** 3

**Contact Hours:** 3

**COS 697: Independent Study**

The student will complete an approved project designed to provide an opportunity to develop an area of expertise not covered by regular curriculum. May be repeated twice for credit.

**Prerequisite:** Consents of the instructor and chairperson

**Credit Hours:** 3

**Contact Hours:** 3

**COS 698: Intern in Computer Science**

Course can be taken for gaining practical experience, on or off campus, in any field of computer science. The student must demonstrate that the experience gained as part of the internship is at least equivalent to the material learned in a typical class. May be repeated twice for credit. Graded pass/fail.

**Prerequisite:** Consent of the chairperson

**Credit Hours:** 3

**Contact Hours:** 3

**COS 796: Project Course**

The successful student completed an approved project designed to develop an area of expertise not covered by regular curriculum. Students will submit an internal report for their project achievements. May be repeated once.

**Prerequisite:** Permission of the instructor

**Credit Hours:** 3

**Contact Hours:** 3

**COS 797: Residence Cred Thesis/Prof Prj**

Prerequisites: completion of the program thesis or project course; approval of advisor. Graduate students who have already earned the maximum credits allowed for program thesis or project course may be registered for this course.

**Credit Hours:** 0

**Contact Hours:** 0

**COS 799: Thesis**

Thesis preparation, presentation, and defense. Students may register for thesis for several semesters. Upon completion of the thesis, students are given a grade of Pass (P) or Fail (F). the thesis is a published work of original research in the field of compute science.

**Credit Hours:** 3

**Contact Hours:** 3