

CYBER SYSTEMS

Department Program Educational Objectives

The UNK Cyber Systems Department seeks to produce well-prepared Cyber Systems graduates who in their careers:

- Apply computing and cyber systems knowledge to real-world problems,
- Keep current in their fields of expertise,
- Communicate effectively with colleagues and other stakeholders,
- Exhibit high standards of responsibility and ethics, and
- Accumulate experiences in collaborating effectively as team members.

College of Business and Technology Graduation Requirements

- All students graduating with a degree from the College of Business and Technology must take at least 50% of their major area credit hour requirements from the College of Business and Technology at the University of Nebraska at Kearney.
- All students graduating with a degree from the College of Business and Technology must take a minimum of 30 of their last 36 hours of credit needed for their degree from the University of Nebraska at Kearney.
- All students graduating with a degree from the College of Business and Technology are required to complete 3 credit hours of designated Experiential Learning (EL) coursework.

Cyber System Requirements

All Cyber Systems majors contain the following core course:

- CYBR 101 OR CYBR 102 OR CYBR 103 (<https://catalog.unk.edu/search/?P=CSIT%20130>)
- Students may enroll in one of the Cyber Systems core courses if they have a minimum score of 22 on the math portion of the ACT or complete Math 101 or above.
- The common core course allows students to defer the decision as to which options to select.

All major courses in the CS Comprehensive, Applied CS, Cyber Security Operations, and Information Technology programs require a minimum grade of "C".

1. Applied Computer Science (<http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/applied-computer-science-bs>) - Bachelor of Science Degree
2. Computer Science Comprehensive (<http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/computer-science-comprehensive-bs>) - Bachelor of Science Degree
3. Cyber Security Operations Comprehensive (<http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/cyber-security-operations-comprehensive-bs>) - Bachelor of Science Degree
4. Information Networking and Telecommunications Comprehensive (<http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/information-networking-telecommunications-comprehensive-bs>) - Bachelor of Science Degree
5. Business Administration Comprehensive Bachelor of Science Degree- Business Intelligence (<http://catalog.unk.edu/catalog->

[archive/2019-2020/undergraduate/departments-programs/cyber-systems/business-administration-comprehensive-business-intelligence-emphasis-bs](http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/business-administration-comprehensive-business-intelligence-emphasis-bs)) Emphasis

6. Information Technology (<http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/information-technology-bs>) - Bachelor of Science Degree
 - Web Development Emphasis (<http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/information-technology-bs/#web>)
 - System Administration Emphasis (<http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/information-technology-bs/#system>)
 - Data Analytics Emphasis (<http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/information-technology-bs/#general>)
 - General Information Technology Emphasis (<http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/information-technology-bs/#general>)

Minors in Data Analytics (<http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/data-analytics-minor>), Management Information Systems (<http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/management-information-systems-minor>), Software Quality Assurance (<http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/software-quality-assurance-minor>), Computer Science (<http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/computer-science-minor>), Information Technology (<http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/information-technology-minor>) and Information Networking and Telecommunications (<http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/information-networking-telecommunications-minor>).

A supplemental endorsement in Information Technology (<http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/supplemental-endorsement-information-technology>) is available.

A certificate in Software Quality Assurance (<http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/cyber-systems/software-quality-assurance-certificate>).

Professor: Vijay Agrawal, Sherri Harms, John Hastings

Associate Professor: Angela Hollman, Allen Taylor

Assistant Professor: Matthew Miller

Cyber Systems (CYBR)

CYBR 100 – Computer Science Principles 3 credit hours

This course provides a broad, inspiring overview of computer science that is appropriate for all students. By the end of this course, students will become empowered to critically analyze computing innovations as well as create inspiring applications that express their interests. In addition, they will be ready to incorporate computational thinking into their future fields of study.

CYBR 101 – Computer Science I: Python for Analytics 4 credit hours

A gentle first course in problem solving and software development; including logic, data storage and manipulation, data types, assignment statements, basic input/output, selection control, repetition control, subprograms, data file input/output, simple GUIs, one dimensional arrays and rudimentary software engineering techniques. Students complete programming projects using Python. Good programming techniques, program clarity, style, and effective documentation are emphasized through practice in designing, coding, and debugging programs. Intended for students with little or no programming experience. It aims to provide students with an understanding of the role computation can play in analyzing data in business, science, mathematical, and other problems. It is designed to help students, regardless of their major, feel justifiably confident of their ability to write small programs that allow them to accomplish useful goals. The class will use the Python programming language. Three hours lecture, two hours laboratory each week.

Prerequisite: Completion of or concurrent enrollment in MATH 102 or ACT Math score of 22 or above or Math placement into MATH 103 or above.

CYBR 102 – Computer Science I: C for Security 3 credit hours

A rigorous first course in problem solving and software development that demonstrates the power of C as a high and low level language. Includes logic, data storage and manipulation, data types, assignment statements, basic input/output, selection control, repetition control, subprograms, parameter passage, scope of identifiers, data file input/output, one dimensional arrays and rudimentary software engineering techniques. Students complete programming projects using C programming. Secure programming techniques, program clarity, style, and effective documentation are emphasized through practice in designing, coding, and debugging programs. Intended for students interested in improving their security or engineering related problem-solving abilities through the use of software development, but no programming experience is necessary. Laboratory assignments develop mastery of the C programming language and a basic understanding of modern secure software development practices. Two hours lecture, two hours laboratory each week.

Prerequisite: Completion of or concurrent enrollment in MATH 102 or ACT Math score of 22 or above or Math placement into MATH 103 or above.

CYBR 103 – Computer Science I: Java for Software Development 4 credit hours

An in-depth first course in problem solving and software development; including logic, data storage and manipulation, data types, assignment statements, standard input/output, selection control, repetition control, subprograms, parameter passage, scope of identifiers, data file input/output, simple GUIs, software classes, objects, one dimensional arrays and rudimentary software engineering techniques. Students complete programming projects using Java. Good programming techniques, object-oriented design, program clarity, style, and effective documentation are emphasized through practice in designing, coding, and debugging programs. Intended for students interested in improving their problem-solving abilities through high quality software development, but no programming experience is necessary. Laboratory assignments develop mastery of a high-level programming language, and programming experience in Java, and a basic understanding of modern software development practices. Three hours lecture, two hours laboratory each week.

Prerequisite: Completion of or concurrent enrollment in MATH 102 or ACT Math score of 22 or above or Math placement into MATH 103 or above or completion of MATH 102 or above.

CYBR 108 – Computers in Society 3 credit hours

This course will consist of an elementary description of the components and principles of digital computers, background and implications of information processing, computer influences on society, and uses of computers. There will be hands-on computer applications that need to be downloaded and installed. Projects are assigned in order to reinforce concepts of problem solving and critical thinking and to illustrate modern applications of computers.

CYBR 140 – The Internet Explained 3 credit hours

This course is a great introduction to how the Internet works. Topics include history of telephony to the Internet, networking, wireless, cybersecurity and how these technologies are integrated into the daily lives of individuals. The course assumes no previous knowledge of the field, and can be used by all students seeking a background in fundamental networking and systems concepts. This course provides basic information needed for the student going on to pursue a career in the information technology fields. It also provides a technological foundation for students pursuing any career. With the prevalence of technology, understanding and becoming proficient with the basic terminology and concepts is a must for any student.

CYBR 150 – Computer Science II: Object Oriented Programming 3 credit hours

Object-Oriented (OO) programming concepts and principles, including an introduction to some basic data structures. Comprehensive study of an OO programming language with a variety of programming applications. An appropriate state-of-the-art language will be used.

Prerequisite: CYBR 101 or CYBR 102 or CYBR 103

CYBR 180 – Discrete Structures 3 credit hours

The study of mathematical topics and data structures necessary for a successful program of study in Computer Science. Topics include set theory, Boolean algebra, propositional calculus, logic circuits and finite state machines.

Prerequisite: CYBR 101 or CYBR 102 or CYBR 103.

Corequisite: Completion of or concurrent enrollment in MATH 115 or MATH 123.

CYBR 182 – Software Productivity Tools 3 credit hours

This lab course addresses competency and applications of computer skills. Software covered includes: operating systems and environments, word processing, spreadsheet, databases and cloud-based solutions.

CYBR 188 – GS Portal 3 credit hours

Students analyze critical issues confronting individuals and society in a global context as they pertain to the discipline in which the Portal course is taught. The Portal is intended to help students succeed in their university education by being mentored in process of thinking critically about important ideas and articulating their own conclusions. Students may take the Portal in any discipline, irrespective of their major or minor. Satisfies the General Studies Portal course requirement. Students may take their Portal course in any discipline. Students who transfer 24 or more hours of General Studies credit to UNK are exempt from taking a portal course.

Prerequisite: First year freshman standing or sophomore standing only.

CYBR 190 – Data Analytics Mathematical Modeling 3 credit hours

This course is designed to cover fundamental IT enabled models and their application in data analytics. Some areas to be covered include: systems of equations and inequalities; sequences, inductions, and the binomial theorem; counting and probability; basic statistics; simulation; data tables and what-if analysis; and enhancing decision-making using Solver.

Prerequisite: MATH 102 and CYBR 182

CYBR 199 – Current Issues in Cyber Systems 1-3 credit hours

A course designed to enable students to become knowledgeable of recent trends and issues in computer science and information technology. The course format varies depending on subject matter, instructor and student needs.

Total Credits Allowed: 6.00

CYBR 223 – Information Technology Infrastructure 3 credit hours

A study of computer organization as it relates to the selection of computer hardware devices. The goal of the course is to create an understanding of the organization issues that influence system design and purchasing decisions. Topics include memory management, RAID, error detection, compaction, process management, pipelining, and cloud computing.

Prerequisite: CYBR 150

Additional Course Fee Required

CYBR 251 – Linux Programming Environment 1 credit hour

A survey of the fundamental concepts of the Linux operating system, including hands on experience with various components including the command line and graphical user interface.

CYBR 252 – Cloud Computing and Containerization 1 credit hour

A survey of the fundamental concepts of building and hosting Linux applications running with operating system level virtualization (containerization).

Prerequisite: CYBR 251

CYBR 280H – Special Topics 3 credit hours

A General Studies course for Honors students. Interdisciplinary course that examines the connections between disciplines.

CYBR 301 – Computer Organization 3 credit hours

A study of computer organization and Assembly language. Topics include basic assembly instructions, logic design, addressing modes and instruction sets, data path, memory hierarchy. Students will gain hands on experience in programming in x86 and ARM assembly.

Prerequisite: CYBR 150 and CYBR 180

Additional Course Fee Required

CYBR 302 – Principles of Management Information Systems 3 credit hours

The course provides an introduction and overview to the field of management of information systems (MIS). This course is designed to familiarize students with the critical roles of information and information systems in support of organizational operations, decision-making processes, quality management, and strategic activities. It also covers management of information systems functions and professionals, as well as relevant global, ethical, societal and legal/regulatory issues. Focus is placed on the impact of rapidly changing technologies, such as the Internet, on organizations leading to new paradigms, like e-commerce and business-to-business applications, and the subsequent reengineering of organizations.

CYBR 305 – Healthcare Informatics & Technology 3 credit hours

With a focus on networking, this course will examine the healthcare field and its integration with the electronic and digital realm. Topics like security protocols, patient privacy, and telemedicine will be studied and then applied to real-world technical scenarios through discussion and hands-on projects.

CYBR 306 – Introduction to Predictive Modeling 3 credit hours

Data Analytics uses real-time processing of sentiment, buzz, social networks, context and/or other data of interest to improve performance and impact. This course will expand on basic statistical and analytical tools for developing an understanding of advanced methods for data analysis and modeling to support decision making. Students learn how to develop, explore, model, and answer questions using analytical processes to examine datasets, including "big data". Predictive modeling is introduced to show how to use these concepts, and others, to support more informed decisions and to drive business strategy using current and rapidly changing technologies. The course covers the fundamentals of databases, data analysis, data visualization, inferential statistics, and reporting; all supporting predictive and prescriptive analytics. Two hours lecture, two hours lab per week.

Prerequisite: MGT 233 or STAT 241 or STAT 345 or BIOL 305 or PSY 250

CYBR 330 – Algorithms and Data Structures 3 credit hours

A comprehensive study of data structures and algorithms with programming applications. Topics include: a review of basic data structures (linked-lists, stacks, queues) and abstract data types, advanced data structures and their associated algorithms, heaps, priority queues, hash tables, trees, binary search trees, and graphs, advanced sorting and searching algorithms, divide and conquer algorithms, greedy algorithms, and dynamic programming. Problem analysis is emphasized. Computability, asymptotic notation and NP-completeness are introduced. An object-oriented programming language will be used.

Prerequisite: ENG 102 and MATH 115 and CYBR 180 and CYBR 150

Additional Course Fee Required

CYBR 335 – Fundamentals of Networking & Systems 3 credit hours

This course is the first technical networking & systems course. Topics covered include layered network architectures, packet sniffing with protocol analysis, virtual local area networks, basic network security and network design through v4 and v6 subnetting.

Prerequisite: CYBR 101 or CYBR 102 or CYBR 103 or CYBR 140 or passing score on CompTIA A+ certification exam.

Additional Course Fee Required

CYBR 340 – Information Networking Preceptorial 4 credit hours

Students in this course study the design and operation of telecommunications and information networks actively deployed in the business enterprise. They also explore the duties and responsibilities of the network manager as they maintain the information and telecommunications networks.

Prerequisite: CYBR 335

CYBR 345 – Intricacies of Advanced Networks & Systems 3 credit hours

This second technical networking & systems course looks in-depth at routing and switching protocols. Students will utilize the hands-on lab environment to examine the routing and switching protocols as well as a variety of other topics like enterprise wireless, network monitoring and high availability. Students with a strong command of the concepts presented will be prepared to sit for specific industry certification exams. Two hours lecture, two hours lab per week.

Prerequisite: CYBR 335

Additional Course Fee Required

CYBR 350 – Predictive Modeling II 3 credit hours

Study of predictive modeling using data analytics tools such as data mining to support various organizational activities. This course is designed to familiarize students with the critical role of data warehousing and data mining as predictive modeling tools to enhance the organizational decision making process.

Prerequisite: CYBR 302 and junior standing

CYBR 381 – Systems Analysis and Design I 3 credit hours

Explore the systems life cycle. Learn tools and strategies for system and information analysis. Includes need identification, feasibility studies, requirements assessment, project management and group dynamics.

Prerequisite: CYBR 101 or CYBR 102 or CYBR 103 or CYBR 335

CYBR 388 – GS Capstone 3 credit hours

An interdisciplinary experience where students apply the knowledge, cognitive abilities, and communication skills they have gained from General Studies in designing and completing an original project or paper. Students employ methods and interpretive means of two or more disciplines to integrate knowledge and synthesize their results. Satisfies the General Studies capstone course requirement. Students may take their Capstone course

Prerequisite: Junior or Senior level standing or within 6 hours of completing general studies requirements.

CYBR 399 – Independent Study in Cyber Systems 1-6 credit hours

This course provides the opportunity for students to conduct independent study on any cyber systems topic not covered by other regularly offered courses. The topic will be selected in consultation with and the study will be supervised by a cyber systems faculty member. The project should be focused on an area of interest to the student. Upon completion of the project a formal presentation will be given by the student to all interested parties. A written contract specifying the topic and requirements must be submitted and approved by the department before registering for the course.

Department Consent Required

Total Credits Allowed: 6.00

Prerequisite: Junior or senior standing and permission of department chair

CYBR 401 – Operating Systems 3 credit hours

Introduction to modern operating system concepts and design. Topics will include: Processes, semaphores, monitors, concurrent process management, virtual memory, file systems, scheduling algorithms, deadlocks and protection, I/O control interrupt handling, client-server model, remote procedure call and threads.

Prerequisite: CYBR 330

CYBR 404 – Software Engineering 3 credit hours

This course will include the fundamental principles of software engineering. Software specification techniques: rigorous methods and formal methods. Software design: object-oriented design, function-oriented design, real-time systems design, user interface design. Programming techniques and tools. Software reuse and software metrics. Design patterns and component based software development. Computer-aided software engineering. Software validation and verification. The object oriented language Java will be used as the major programming language for this course.

Prerequisite: CYBR 330

Additional Course Fee Required

CYBR 405 – Interactive Web Application Development 3 credit hours

This course covers the wide range of state-of-the-art computer technologies for interactive web application development. Students will learn how to write both static web pages and dynamic web pages. This is a programming-intensive course.

Prerequisite: CYBR 101 or CYBR 102 or CYBR 103 or CYBR 434

CYBR 406 – Enterprise Web Application Development 3 credit hours

This course is designed to assist students in learning the skills necessary to design and build enterprise-level web applications. Skills and knowledge gained in this course can be applied in the development of interactive web sites, electronic commerce systems, cloud-based applications and other service-based architectures. Security of internet based information systems will also be covered.

Prerequisite: CYBR 150

CYBR 407 – Introduction to Automata, Formal Languages, and Computability 3 credit hours

A survey of the fundamental concepts and conclusions in the theory of computation. Topics cover regular languages and finite automata, context-free languages and pushdown automata, formal grammars, Chomsky hierarchy, Turing machine and computability, computational complexity.

Prerequisite: Junior standing and CYBR 180 or MATH 115

CYBR 408 – Principles of Programming Languages 3 credit hours

Study of the essential concepts of programming languages including, language design concepts and semantics; examination of language features and major programming paradigms with a focus on functional programming; and design and implementation of language interpreters.

Prerequisite: CYBR 407 and CYBR 301 or CYBR 330

CYBR 410 – Big Data I 3 credit hours

This course provides an understanding of data analytics advanced techniques to extract intelligence about organizational activities from big data sources. Managing, governing, extracting, merging, and preparing large data sets for analysis using real data are covered extensively.

Prerequisite: CYBR 350

CYBR 411 – Big Data II 3 credit hours

This course provides a set of practical and powerful tools to enhance the understanding of big data. Exposure to computerized tools facilitating the loading and cleansing of data for analysis provides an experiential learning approach to understanding big data concepts.

Prerequisite: CYBR 410

CYBR 418 – E-Commerce Information Systems 3 credit hours

This course will present, develop, explore, and illustrate the nature and use of E-commerce Information System development methodologies in an inter-organizational setting, and discuss responsibilities at all life cycle stages. It is a comprehensive study of electronic commerce, with in-depth coverage of e-commerce technologies and e-commerce business models including business-to-consumer models, business-to-business models, consumer-to-consumer models, peer-to-peer models, and mobile commerce. It introduces global e-commerce, security and encryption issues, and ethical, social and political issues related to e-commerce. E-commerce interface designs for electronic storefronts, malls, catalogs, shopping carts, search engines, auctions, e-payment systems, e-learning, and e-government will be covered. Consumer interactions with payment processing mechanisms and relationships to information technology development and support will be studied.

Prerequisite: CYBR 101 or CYBR 102 or CYBR 103 or CYBR 302 or CYBR 434 and Sophomore standing or above

CYBR 421 – Business Process Redesign and ERP Systems 3 credit hours

This course provides an understanding of business processes and usage of various methods and computerized tools to redesign these processes. The redesigned processes will assist organizations in providing cost-effective quality products and services to consumers. Further, this course provides an overview of the Enterprise Resource Planning (ERP) Systems which are widely used by corporations for automation of their processes. Prerequisite: Junior standing

CYBR 422 – Computer Graphics 3 credit hours

Introduction to the techniques for generating lines, curves, surfaces, 2D and 3D graphics, modeling and rendering. Topics include display hardware, transformations, interactive technologies, geometric modeling, 2D and 3D display algorithms, graphics software system architecture, visible-surface algorithms, illumination and shading.

CYBR 425 – Database Systems 3 credit hours

This course is a comprehensive study of multi-user database concepts. The relational model and relational database management systems along with proper database design will be emphasized. The normalization process and the various normal forms will be covered. Internet database applications are introduced. SQL will serve as the standard language for database manipulation. Several current database management systems will be introduced and will serve as the sample DBMSs for implementation of the course material.

Prerequisite: CYBR 101 or CYBR 102 or CYBR 103 or CYBR 434

CYBR 430 – Protecting & Defending Networks & Systems 3 credit hours

This course will cover all the concepts necessary defense-in-depth of an enterprise network and system (blue team). A case study will be incorporated to achieve a strong understanding of the design, implementation and overall security of a large network. Hands-on labs will be conducted using a variety of networking and systems equipment. Students with a strong command of the concepts presented will be prepared to sit for specific industry certification exams. This course presents a comprehensive study of needs and characteristics of a global internetwork and the issues encountered on such a network. Topics studied will include security, servers, user identity, and wireless. Hands-on labs will be conducted using a variety of network equipment.

Prerequisite: CYBR 335 and CYBR 101 or CYBR 102 or CYBR 103

Additional Course Fee Required

CYBR 434 – Information Technology Teaching Methods 3 credit hours

This course will include information technology curriculum development and instruction, with a focus on applying programming concepts to K-12 education. Intended only for students in education fields.

Prerequisite: Junior or senior standing

CYBR 435 – Thinking like an Adversary: Systems Side Security 3 credit hours

This course will cover all the concepts necessary to play offense against different types of enterprise networks and systems (red team). Different scenarios will be "played out" utilizing a series of hands-on labs with the idea that students will learn the concept of "thinking like an adversary". In this manner, the students will learn how to better defend networks by understanding the offensive playbook.

Additional Course Fee Required

CYBR 440 – Systems Audit 3 credit hours

This course provides an understanding of many types of audit needs, such as organizational IT audits (management control over IT), technical IT audits (infrastructure, data centers, data communication), application IT audit (business, financial, operational), development/implementation IT audits (specification/requirements, design, development, and post development phases), and compliance IT audits involving national and international standards.

Prerequisite: Senior standing

CYBR 441 – Artificial Intelligence 3 credit hours

An in-depth study of intelligent agents, tree and search methods, constraint satisfaction problems, optimization problems, game-playing, logical analysis, and uncertainty modeling. Machine learning techniques are introduced. Applications to robotics, psychology, business intelligence and data mining are also discussed.

Prerequisite: CYBR 150

Additional Course Fee Required

CYBR 444 – Software Reverse Engineering 3 credit hours

This course provides students with the opportunity to standard techniques used to Reverse Engineer software systems. These techniques will allow students to understand the process involved in program compilation, such that they can deduce the functionality of a program and recreate a programs source code without the original source.

Prerequisite: CYBR 301

CYBR 448 – System Administration 3 credit hours

This course provides an overview of how to manage a server and its users. Topics include but not limited to installing server operating system, creating user and group accounts, setting up policies, adding and configuring devices and drivers, managing data storage, setting up security evaluating performance, trouble shooting, and virtualization.

Prerequisite: CYBR 101 or CYBR 102 or CYBR 103 or CYBR 345 or CYBR 434

CYBR 450 – Software Quality Assurance 3 credit hours

This course will provide students with the knowledge and skills to define and implement software quality management. We will explore ways to develop a quantifiably effective software quality management function and measure the success of quality assurance (QA) plans, teams and tools. The course will explore the latest industry standards, tools and approaches, and will explore the challenges of managing the QA function for modern software application environments.

Prerequisite: CYBR 381

CYBR 458 – Computer Security 3 credit hours

This course provides an overview of security issues associated with the development and deployment of information systems. Topics include authentication, encryption, firewalls, security standards and protocols, attack prevention, detection, and recovery.

Prerequisite: CYBR 150 or CYBR 345 or CYBR 448

CYBR 460 – Virtualization Essentials 3 credit hours

Examining the new world of virtualization, this technical essentials course looks at concepts such as cloud computing, virtualized hardware, networks, storage and data center concepts. Although the focus will be virtualization at the data center, these fundamentals are easily transferrable and highly needed in small to large enterprise. Topics such as hypervisors, software-defined networking and cloud architectures are discussed in-depth.

CYBR 468 – Advanced Security: Playing Both Sides 3 credit hours

This course provides an introduction to advanced security topics associated with the development and deployment of information systems. Topics include WiFi and cellular networks, fuzzing, software vulnerabilities, and secure development practices .

Prerequisite: CYBR 435

CYBR 475 – Internship in Cyber Systems 1-6 credit hours

An internship is a professional or technical position in a professional environment that provides a student with sufficient practical work experience for a limited period of time, allows for career decision-making, and provides the employer valuable skills to accelerate business objectives. Internships are mutually beneficial for all involved. The student gains the opportunity to apply classroom learning to a workplace environment; the employer has the chance to work with students eager to learn and apply skills; and the university benefits from connections with business and industry, which provide potential for program development and enhancement. The learning experience is organized and supervised by the academic department, the CBT Career Center, and personnel of selected industries. All internships must be approved by the CBT Career Center and students must have a major or minor in the Cyber Systems department. The course will be evaluated on a credit/no credit basis.

Department Consent Required

Total Credits Allowed: 6.00

CYBR 484 – Parallel Computing 3 credit hours

Introduces parallel computing including parallel computer architectures, analytical modeling of parallel programs, principles of parallel algorithm design. Introduces existing mainstream parallel programming environments and present development situations to provide students with skills to design, code, debug, analysis and optimize some mainstream parallel software. Provides hands-on practice with parallel computing that provides student with a successful start to practice in the area of parallel.

Prerequisite: CYBR 401

CYBR 485 – Information Systems Strategy and Management 3 credit hours

To provide a set of practical and powerful tools to ensure the understanding of strategic, tactical, and operational responsibilities of the chief information officer (CIO). The strategic responsibilities include the strategic alignment among information technology and business functions of the organizations.

Prerequisite: Junior standing

CYBR 490 – Information Networking Law and Public Policy 3 credit hours

This course provides a current and historical review of statutes, regulations, and municipal ordinances in telecommunications and information network security. Fundamental cybersecurity requirements are examined for several industry sectors. Topics also include network breach notification requirements, the NIST Risk Management Framework and NIST Cybersecurity Framework.

CYBR 494 – Directed Research in Cyber Systems 1-6 credit hours

Independent original research in a Cyber Systems area, under the direction of a Cyber Systems faculty member. A written contract specifying the topic and requirements must be submitted and approved by the department before registering for the course. Upon completion of the project a formal presentation will be given by the student to all interested parties.

Department Consent Required

Total Credits Allowed: 6.00

Prerequisite: Junior or senior standing and permission of department

CYBR 495 – Cyber Systems Capstone 3 credit hours

This course provides experience and background that will prepare the student for an actual working environment. Reinforcement and validation of knowledge gained in previous course work, enhancement of communication skills, and learning to work with people will be emphasized. Primary tasks will include a team-based project using technologies appropriate to the student's program of study, the study of ethics for cyber systems professionals, and project design and development and project oversight using appropriate project management tools. This course also provides opportunity for writing in the cyber systems disciplines.

Prerequisite: CYBR 330 or CYBR 381 or CYBR 490

Additional Course Fee Required

CYBR 498 – Special Topics in Cyber Systems 3 credit hours

Course is designed to enable students to become knowledgeable of recent trends and issues in cyber systems. The course format varies depending on subject matter, instructor and student needs.

Total Credits Allowed: 6.00

CYBR 499 – Special Problems 1-3 credit hours

Independent investigations of organizational problems. Topics to be investigated may be tailored to meet the needs of the student. The course is designed to integrate the knowledge acquired in other courses in the student's program of study and provides the opportunity for students to conduct independent study on any cyber systems topic not covered by other regularly offered courses. The study topic will be selected in consultation with the supervising cyber system's faculty member. A written contract specifying the topic and requirements must be submitted and approved by the department before registering for the course.

Department Consent Required

Total Credits Allowed: 6.00

Prerequisite: Junior or senior standing

Computer Science and Information Technology (CSIT)

CSIT 100 – Computing Environments 1 credit hour

This course presents any one of a variety of currently demanded computer topics. It focuses on hands-on exposure to computer-based enhancement of personal productivity. Grading method is credit/no credit.

CSIT 100.1 – Computing Environments: Word Processing 1 credit hour**CSIT 100.2 – Computing Environments: Spreadsheet 1 credit hour****CSIT 100.3 – Computing Environments: Database 1 credit hour****CSIT 100.5 – Computing Environments: Presentation Graphics 1 credit hour****CSIT 100.6 – Computing: Networking 1 credit hour****CSIT 100.9 – Computing Environments: Software Sampler 1 credit hour****CSIT 100D – Computing Environments: Windows 1 credit hour****CSIT 100E – Computing Environments: WWW Home Pages 1 credit hour****CSIT 100F – Computing Environments: MVS 1 credit hour****CSIT 100G – Computing Environments: JCL 1 credit hour**

CSIT 210 – Structured Transaction Programming 3 credit hours

This is an introductory programming course. The topics include basic computer concepts and terminology, in conjunction with program development using elements of a programming language. Stress is placed upon transaction processing algorithm using structured programming. The assignments are exercises that develop in-depth skills and techniques from the lecture topics. CSIT 100.F MVS and CSIT 100.G JCL are recommended co-requisites.

CSIT 310 – Programming Data and File Structures 3 credit hours

Study of advanced structured COBOL programming techniques and applications with respect to table handling, subprograms, sequential files, and indexed sequential files.

Prerequisite: CSIT 210

CSIT 350 – Information Systems Concepts 3 credit hours

This course deals with the role, structure and objectives of information systems. Other topics include theory of systems and information, decision support, human considerations, applications of information systems, system evaluation and selection.

Prerequisite: Completion of CSIT 111 or CSIT 130 and ENG 102

Enrollment not allowed in CSIT 350 if MIS 302 has been completed

CSIT 380 – Systems Analysis and Design 3 credit hours

Explore the System Development Life Cycle. Learn tools and strategies for system and information analysis, including need identification, feasibility studies, data and process modeling, requirements assessment, project management and group dynamics.

Prerequisite: Completion of CSIT 150 Enrollment not allowed in CSIT 380 if MIS 381 has been completed.

CSIT 399 – Campus Lab Consultantship 1-3 credit hours

Work in campus computer labs as a consultant to computer science and computer information technology students. (A total of three credit hours in any combination of CSIT 399 and CSIT 492-495 may be applied toward a computer science/information technology major or minor.)

Department Consent Required

Total Credits Allowed: 9.00

CSIT 405 – Compiler Construction 3 credit hours

Techniques and organization of compilers, assemblers, and interpreters. Structure of programming language symbol tables, scans, and object code generation.

Prerequisite: CSIT 402

CSIT 426 – Computer Architecture 4 credit hours

The study of the logic and theory of operation of the main hardware blocks of computers, their control, and their software/hardware interactions. The emphasis is on microcomputer architecture, including laboratory experiments with various systems and their I/O and interfacing characteristics.

Prerequisite: PHYS 205 and PHYS 205L or PHYS 275 and PHYS 275L and six hours of CSIT courses preferably CSIT 130 and CSIT 301.

CSIT 428 – Data Communications and Distributed Processing 3 credit hours

The study of network topology, protocols, management, and communication media. Evaluate present communication hardware, software, and future advancements in networking.

Prerequisite: CSIT 130 or CSIT 434 or ITEC 345

CSIT 493 – Directed Readings in Computer Science/Information Technology 1-3 credit hours

Independent readings on advanced or contemporary topics in computer science/ information technology, to be selected in consultation with and directed by a computer science/ information technology faculty member. A written contract specifying readings and requirements for the course is required before registering for the course. Any topic that is thoroughly covered by any regularly offered computer science or information technology course is not allowed for Directed Readings.

Upon completion of the project a format presentation will be given by the student to all interested parties. (A total of three credit hours of any combination of CSIT 399 and CSIT 492-495 may be applied toward a computer science/information technology major or minor.)

Department Consent Required

Total Credits Allowed: 6.00

Prerequisite: CSIT 150 and permission of department chair

CSIT 497 – Seminar in Information Technology 3 credit hours

This course provides experience and background that will prepare the student for an actual working environment. Reinforcement and validation of knowledge gained in previous course work, enhancement of communication skills, and learning to work with people will be stressed. Primary tasks will include a team-based information systems development project and the study of ethics for CS/IT professionals.

Prerequisite: Completion of CSIT 380 and completion of or concurrent enrollment in CSIT 425.

Additional Course Fee Required