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# TOP 100
### ENGINEERING PROGRAMS IN THE COUNTRY

## COMMUNITY

When you join the College of Engineering, you become a part of something bigger. You will find a number of opportunities to get to know your fellow engineering and computing students. As a freshman, you will have the opportunity to join the Engineering Living Learning Community (LLC), which will bring you together with other engineering majors as neighbors in Shocker Hall, Wichita State's first-year residence hall.

## DEGREE OPTIONS

As a student at Wichita State University, the College of Engineering offers you the opportunity to earn your degree majoring in Cybersecurity. In addition to this opportunity, if you choose to major in a separate field of study, the College of Engineering still provides the opportunity to minor in Cybersecurity.
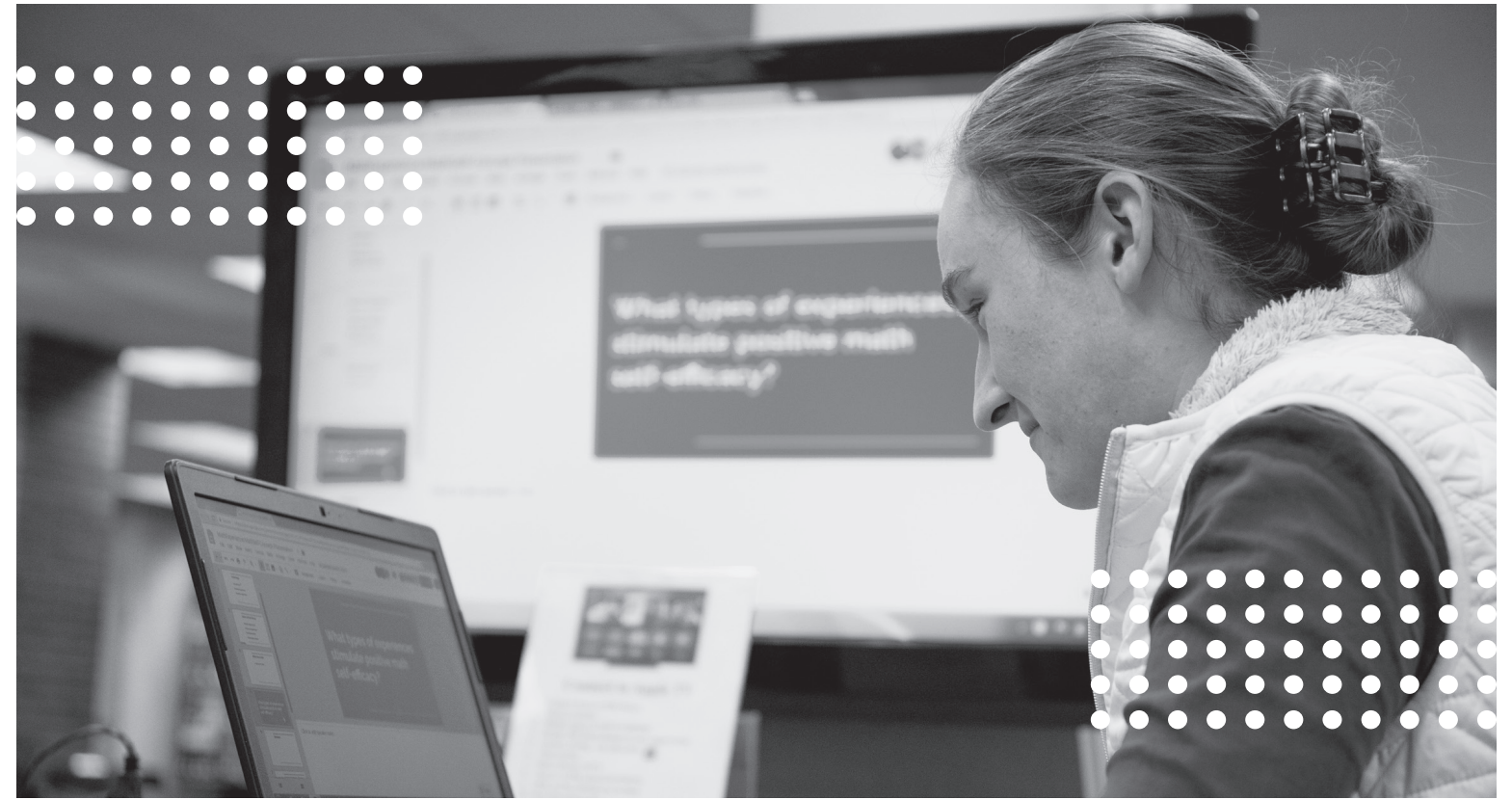
# TOP 50
### IN TOTAL ENGINEERING RESEARCH & DEVELOPMENT

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Wichita State University

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## WICHITA STATE UNIVERSITY



# COLLEGE OF ENGINEERING CYBERSECURITY

Wichita State University

## WHAT IS APPLIED CYBERSECURITY?

The Applied Computing program focuses on the application of computer technology skills and the understanding of these skills in the real world. Career tracks and electives were developed with advice from industry experts.

## WHAT IS APPLIED LEARNING?

A Bachelor of Science in applied computing from Wichita State will equip you with the knowledge and practical skills needed for a successful career in the growing information technology sector. Students get hands-on experience through industry and community-sponsored projects, which they present to industry at WSU's Engineering Open House.

## CYBERSECURITY DEGREE SAMPLE SCHEDULE

### Freshman Year

**1st Semester**
• Seminar
• Public Speaking
• College Algebra
• College English I
• Cybersecurity Awareness

**2nd Semester**
• General Psychology
• College Trigonometry
• College English II
• Applied Analog and
  Digital Electronic
• Applied Computing
  and Networks I

### Sophomore Year

**1st Semester**
• General College Physics I
• Introductory Design Project
• Applied Computing
  and Networks II
• Principles of Macro Econ
• TE - Recommend Intro Logic

**2nd Semester**
• General College Physics II
• Social Psychology
• FA (at 300 level or above
  unless STAT370 is taken)
• Applied Programing
  and Scripting
• Applied Web Apps and
  DB Development

### Junior Year

**1st Semester**
• Intermediate Project Design
• Psychological Statistics
  or Elementary Statistics
• Elective or TEs

**2nd Semester**
• Cyber Operations
• Ethics and Computers
• Elective or TEs

### Senior Year

**1st Semester**
• Senior Design Project I
• Elective or TEs

**2nd Semester**
• Senior Design Project II
• Elective or TEs

## COURSE DESCRIPTIONS

### Cybersecurity Awareness

The ability to secure information and systems is a growing challenge. Human threats are global, persistent, and increasingly sophisticated. Vulnerabilities within the complex and interdependent network of systems continue to be discovered and have yet to become common knowledge. Exploited vulnerabilities can have a devastating impact on an organization or a society. This course familiarizes users with information, cyberspace and security principles to understand these threats. The course addresses information infrastructures, social engineering, information system exploitation techniques, and countermeasures to the threats discussed.

### Applied Scripting and Networking II

Continuation of Applied Computing and Networking I. This course provides an in-depth look at Windows and Linux operating systems operation and administration, and more detailed topics on OSI 7-Layer Model, common networking protocols and services, VOIP, etc. Students go into more depth on network enterprise design and operation including wireless and mobile technology use and system operation. Introduces IoT, cloud services (web-based storage, applications, services, hosts).

### Applied Web Applications and Database Development

Each web application has a set of requirements such as financial transaction, customer information, etc. This course covers the two purposes that web application fulfills and web and database technologies, services, protocols, design and operation. Students learn a variety of languages including HTML, CSS, Apache and MySQL, and apply the languages through hands-on projects.

### Human Threats

This course covers human threats to cybersecurity within political, social and economic contexts. Includes targeted exploitation and manipulation of individuals, small groups and larger groups through social engineering, marketing, propaganda, psychological operations and by what methods. This class will also cover the behaviors of victims as well as perpetrators.

### Cyber Physical Systems

This course focuses on trustworthy and resilient CPS, starting with NIST's CPS Framework. Students learn about common IoT infrastructures, integrate CPS into organizational risk management, and conduct cybersecurity risk assessments for critical cyber physical systems.

### Applied Computing and Networking I

This course helps students gain vital concepts in computer hardware, operating systems, networking, and security to solve real-world computing challenges. Students collaborate effectively and think critically to devel- op specialized foundational skills in computing and networking. Students learn to use industry-standard tools with hands-on class projects. Covers fundamental concepts in computer hardware, Linux and Windows operating systems, virtualization, computer networking including OSI layer, LAN, WAN, VPN, and basic network security including hashing and encryption.

### Applied Programming and Scripting

Designed for IT professionals interested in learning basic coding and scripting skills. Teaches vital skills needed to develop and customize applications that interact with file systems, databases, networks and websites. Covers command shell scripting (cmd, powershell, bash) in Windows and Linux operating systems. Emphasizes scripting cybersecurity tasks such as system configuration, system auditing, and penetration testing. Also covers Arduino microcontrollers, coding Arduino in Python, and coding TCP Traceroute. Python language is used in this course.

### Cyber Operations

This course covers concepts related to cyber attack, penetration testing, cyber intelligence, cryptography and cyber defense. Students learn the attacker's perspective and how security infrastructure integrates with the rest of the business and IT infrastructure through the use of hands-on projects.

### Digital Forensics

This course covers concepts pertaining to hardware and software forensics, incident response, cyber crime and cyber law enforcement. Students learn the different aspects of computer and cyber crime and ways to uncover, protect, exploit and document digital evidence. Students are exposed to different types of tools, techniques, and procedures, and are able to use them to perform rudimentary forensic investigations. Focuses on the entire life cycle of incident response including preparation, data collection, data analysis and remediation.

### Cyber Risk Managment

This course covers the application of risk and information security management in order to improve organizational resilience. Concepts include business impact analysis, incident response planning, disaster recovery planning, business continuity planning and security auditing.

## APPLIED APPLICATIONS

### Cybersecurity Essentials

**Job Application:**
• Network Defense
• Training Manager
• IT Specialist

**Potential Employers:**
• Manages Security Service Providers
• Large Companies
• Consulting Firms

### Data Web Security

**Job Application:**
• Software Analyst
• Network Defense
• Forensics Specialist

**Potential Employers:**
• E-Commerce
• Web Application Developers
• Operating Systems Providers

### Human Threats

**Job Application:**
• Red Teams
• Cyber Intelligence
• Forensics
• Research

**Potential Employers:**
• Government Agencies
• Consulting Firms
• Large Corporations
• Academia

### Cyber Physical Systems

**Job Application:**
• Internet of Things Security
• Manufacturing Security
• Industrial Control Systems

**Potential Employers:**
• Department of Homeland Security
• Large Manufacturing Companies
• Public Works
• Energy Sectors

## SAMPLE ELECTIVE TRACKS

### IT Fundamentals
• Applied Computing
  and Networks I
• Applied Computing
  and Networks II
• Applied Programming
  and Scripting

### Pre-Requisites for Cybersecurity Essentials
• Cyber Security Awareness
• Applied Computing
  and Networks I
• Applied Computing
  and Networks II
• Applied Programming
  and Scripting
• Applied Web Apps and
  DB Development

### Data and Web Security
• Business Software
• Cyber Risk Managment
• Systems Analysis and Design
• Web Application Security
• Managment of the IS Function

### Human Factors in Tech and Security
• Social Psychology
• Human Threats to
  Cyber Security
• Human Factors Psychology
• Digital Forensics
• Cyber Risk Managment

### Cybersecurity Essentials
• Digital Forensics
• Cyber Risk Managment
• Cyber Physical Systems
• Web Application Security

### Cyber Physical Systems
• Calculus I
• Circuits Technology
• Industrial Controls
  and Instrumentation
• Cyber Physical Systems