CYBERSECURITY ENGINEERING - B.S.

College of Aeronautics and Engineering
www.kent.edu/cae

About This Program

Become a cybersecurity engineer with Kent State's B.S. program. Gain hands-on experience and develop the skills needed to protect systems and prevent cyber attacks. With our world being more connected than ever, this program prepares you to analyze and prevent potential security threats to an engineering system. Computer systems are just the beginning. Enroll now to jump start your career in a quickly growing field. Read more...

Contact Information

- cae@kent.edu | 330-672-2892
- Speak with an Advisor
- Chat with an Admissions Counselor

Program Delivery

- **Delivery:**
  - In person
- **Location:**
  - Kent Campus

Examples of Possible Careers and Salaries*

Information security analysts

- 31.2% much faster than the average
- 131,000 number of jobs
- $103,590 potential earnings

Computer and information systems managers

- 10.4% much faster than the average
- 461,000 number of jobs
- $151,150 potential earnings

Software developers and software quality assurance analysts and testers

- 21.5% much faster than the average
- 1,469,200 number of jobs
- $110,140 potential earnings

* Source of occupation titles and labor data comes from the U.S. Bureau of Labor Statistics' Occupational Outlook Handbook. Data comprises projected percent change in employment over the next 10 years; nation-wide employment numbers; and the yearly median wage at which half of the workers in the occupation earned more than that amount and half earned less.

Admission Requirements

The university affirmatively strives to provide educational opportunities and access to students with varied backgrounds, those with special talents and adult students who graduated from high school three or more years ago.

Admission to the Cybersecurity Engineering major is selective.

New Students: Admission into this major requires:

- Minimum 3.0 high school GPA
- Clear demonstration of an ability to be placed directly into MATH 12002 (or its equivalent); this will occur if the student is currently taking or has taken a calculus, pre-calculus or trigonometry course with a minimum C grade

Students who do not meet the above requirements will be admitted to the **Computer Engineering Technology** major, provided they meet the minimum program requirements.

Note: Applicants should understand that this is a math-intensive program. Students admitted to the program are expected to demonstrate prerequisite knowledge on a math placement exam (the ALEKS exam) prior to starting their first semester. Students who do not obtain the minimum score required to place into MATH 12002 will have their major changed to **Computer Engineering Technology** prior to their first year at Kent State.

Current Students: Students accepted into the **Computer Engineering Technology** major may request a change in major to Cybersecurity Engineering as soon as placement into MATH 12002 has been demonstrated (prior to the beginning of their first year at Kent State). Otherwise, students may request to change their major to Cybersecurity Engineering after their first year at Kent State if they meet the following criteria:

- Minimum 3.000 overall Kent State GPA
- Minimum C grade in both MATH 12002 and PHY 23101

Transfer Students: Admission into this major requires:

- Minimum 12 credit hours of college-level coursework
- Minimum 3.000 overall GPA
- Minimum C grade in both MATH 12002 and PHY 23101 (or their equivalents)

Transfer students who have completed fewer than 12 credit hours of college-level coursework will be evaluated on both collegiate and high school records and must submit a final high school transcript.

International Students: All international students must provide proof of English language proficiency (unless they meet specific exceptions to waive) by earning a minimum 71 TOEFL iBT score, minimum 6.0 IELTS score, minimum 47 PTE score or minimum 100 DET score, or by completing the ELS level 112 Intensive English Program. For more information on international admission visit the admissions website for international students.

Effective for the fall 2025 admission term:

New Students: Admission into this major requires:

- Minimum 3.0 high school GPA
- Completion of high school algebra II or a college-level algebra course with a minimum C grade

Students who do not meet the above requirements will be admitted to the **Computer Engineering Technology** major, provided they meet the minimum program requirements.

Current Students: Students accepted into the **Computer Engineering Technology** major may request a change in major to Cybersecurity Engineering as soon as placement into MATH 11022 has been demonstrated (prior to the beginning of their first year at Kent State). Otherwise, students may request to change their major to Cybersecurity Engineering after their first year at Kent State if they meet the following criteria:

- Minimum 3.000 overall Kent State GPA
- Minimum C grade in both MATH 11022 and PHY 13001

Transfer Students: Admission into this major requires:

- Minimum 12 credit hours of college-level coursework
- Minimum 3.000 overall GPA
- Minimum C grade in both MATH 11022 and PHY 13001 (or their equivalents)

Transfer students who have completed fewer than 12 credit hours of college-level coursework will be evaluated on both collegiate and high school records and must submit a final high school transcript.

Students from countries or schools that do not specify math topics on their transcripts must demonstrate a minimum C grade in all math courses.

International Students: All international students must provide proof of English language proficiency (unless they meet specific exceptions to waive) by earning a minimum 71 TOEFL iBT score, minimum 6.0 IELTS score, minimum 47 PTE score or minimum 100 DET score, or by completing the ELS level 112 Intensive English Program. For more information on international admission visit the admissions website for international students.

Program Requirements
Major Requirements

Code	Title	Credit Hours
Major Requirements (courses count in major GPA)		
CS 13001	COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING	4
or CS 13011 & CS 13012	COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING	
CS 23001	COMPUTER SCIENCE II: DATA STRUCTURES AND ABSTRACTION	4
CS 23022	DISCRETE STRUCTURES FOR COMPUTER SCIENCE	3
CS 47207	DIGITAL FORENSICS	3
CS 47221	INTRODUCTION TO CRYPTOLOGY	3
ENGR 10005	INTRODUCTION TO CYBERSECURITY	3
ENGR 20000	PROFESSIONAL DEVELOPMENT IN ENGINEERING	1
ENGR 26305	NETWORKING I	2
ENGR 26306	NETWORKING I LABORATORY	2
ENGR 27100	FUNDAMENTALS OF OPERATING SYSTEMS FOR ENGINEERING	3
ENGR 33320	APPLIED EMBEDDED SYSTEMS I	3
ENGR 35500	SIGNALS AND CIRCUITS	3
ENGR 35501	SIGNALS AND CIRCUITS LABORATORY	1
ENGR 35550	LAW AND ETHICS FOR ENGINEERS	3
ENGR 36305	NETWORKING II	2
ENGR 36306	NETWORKING II LABORATORY	1
ENGR 36337	INFORMATION TECHNOLOGY SECURITY	3
ENGR 37777	CYBERSECURITY OPERATIONS	2
ENGR 37778	CYBERSECURITY OPERATIONS LABORATORY	1
ENGR 46305	NETWORK SECURITY	2
ENGR 46306	NETWORK SECURITY LABORATORY	1
ENGR 46312	WIRELESS NETWORK AND TELECOMMUNICATION SYSTEMS	3
ENGR 46316	SERVER ADMINISTRATION AND CONFIGURATION I	3
ENGR 47200	SYSTEMS ENGINEERING	3
ENGR 48099	ENGINEERING CAPSTONE I (ELR) [1]	3
ENGR 48199	ENGINEERING CAPSTONE II (ELR) (WIC) [1,2]	3
Engineering (ENGR) Upper-Division Elective (30000 or 40000 level)		3
Additional Requirements (courses do not count in major GPA)		
COMM 15000	INTRODUCTION TO HUMAN COMMUNICATION (KADL)	3
MATH 12002	ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
MATH 12003	ANALYTIC GEOMETRY AND CALCULUS II	5
MATH 30011	BASIC PROBABILITY AND STATISTICS	3
MATH 32051	MATHEMATICAL METHODS IN THE PHYSICAL SCIENCES I	4
PHY 23101	GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)	5
PHY 23102	GENERAL UNIVERSITY PHYSICS II (KBS) (KLAB)	5
UC 10001	FLASHES 101	1
Kent Core Composition		6
Kent Core Humanities and Fine Arts (minimum one course from each)		9
Kent Core Social Sciences (must be from two disciplines)		6
Kent Core Additional		3
Minimum Total Credit Hours:		**123**

[1] ENGR 48099 and ENGR 48199 must be taken during the same academic year.

[2] A minimum C grade must be earned to fulfill the writing-intensive requirement.

Graduation Requirements

Minimum Major GPA	Minimum Overall GPA
2.500	2.250

Roadmap

This roadmap is a recommended semester-by-semester plan of study for this major. However, courses designated as critical (!) must be completed in the semester listed to ensure a timely graduation.

Semester One		Credits
COMM 15000	INTRODUCTION TO HUMAN COMMUNICATION (KADL)	3

	CS 13001 or CS 13011 *and* CS 13012	COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING or COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING *and* COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING	4
!	MATH 12002	ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
	UC 10001	FLASHES 101	1
	Kent Core Requirement		3
		Credit Hours	**16**
Semester Two			
	ENGR 10005	INTRODUCTION TO CYBERSECURITY	3
!	MATH 12003	ANALYTIC GEOMETRY AND CALCULUS II	5
	Kent Core Requirement		3
	Kent Core Requirement		3
	Kent Core Requirement		3
		Credit Hours	**17**
Semester Three			
	ENGR 20000	PROFESSIONAL DEVELOPMENT IN ENGINEERING	1
	ENGR 27100	FUNDAMENTALS OF OPERATING SYSTEMS FOR ENGINEERING	3
	MATH 32051	MATHEMATICAL METHODS IN THE PHYSICAL SCIENCES I	4
	PHY 23101	GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)	5
	Kent Core Requirement		3
		Credit Hours	**16**
Semester Four			
	CS 23001	COMPUTER SCIENCE II: DATA STRUCTURES AND ABSTRACTION	4
	CS 23022	DISCRETE STRUCTURES FOR COMPUTER SCIENCE	3
	PHY 23102	GENERAL UNIVERSITY PHYSICS II (KBS) (KLAB)	5
	Kent Core Requirement		3
		Credit Hours	**15**
Semester Five			
	ENGR 26305	NETWORKING I	2
	ENGR 26306	NETWORKING I LABORATORY	2
!	ENGR 35500	SIGNALS AND CIRCUITS	3
	ENGR 35501	SIGNALS AND CIRCUITS LABORATORY	1
	ENGR 36337	INFORMATION TECHNOLOGY SECURITY	3
	MATH 30011	BASIC PROBABILITY AND STATISTICS	3
		Credit Hours	**14**
Semester Six			
	CS 47221	INTRODUCTION TO CRYPTOLOGY	3
	ENGR 36305	NETWORKING II	2
	ENGR 36306	NETWORKING II LABORATORY	1
	ENGR 37777	CYBERSECURITY OPERATIONS	2
	ENGR 37778	CYBERSECURITY OPERATIONS LABORATORY	1
	ENGR 47200	SYSTEMS ENGINEERING	3
	Kent Core Requirement		3
		Credit Hours	**15**
Semester Seven			
	ENGR 35550	LAW AND ETHICS FOR ENGINEERS	3
	ENGR 46316	SERVER ADMINISTRATION AND CONFIGURATION I	3
!	ENGR 48099	ENGINEERING CAPSTONE I (ELR)	3
	Engineering (ENGR) Upper-Division Elective (30000 or 40000 level)		3

	Kent Core Requirement		3
		Credit Hours	**15**
Semester Eight			
	CS 47207	DIGITAL FORENSICS	3
	ENGR 33320	APPLIED EMBEDDED SYSTEMS I	3
	ENGR 46305	NETWORK SECURITY	2
	ENGR 46306	NETWORK SECURITY LABORATORY	1
	ENGR 46312	WIRELESS NETWORK AND TELECOMMUNICATION SYSTEMS	3
!	ENGR 48199	ENGINEERING CAPSTONE II (ELR) (WIC)	3
		Credit Hours	**15**
		Minimum Total Credit Hours:	**123**

University Requirements

All students in a bachelor's degree program at Kent State University must complete the following university requirements for graduation.

NOTE: University requirements may be fulfilled in this program by specific course requirements. Please see Program Requirements for details.

Flashes 101 (UC 10001)	1 credit hour
Course is not required for students with 30+ transfer credits (excluding College Credit Plus) or age 21+ at time of admission.	
Diversity Domestic/Global (DIVD/DIVG)	2 courses
Students must successfully complete one domestic and one global course, of which one must be from the Kent Core.	
Experiential Learning Requirement (ELR)	varies
Students must successfully complete one course or approved experience.	
Kent Core (see table below)	36-37 credit hours
Writing-Intensive Course (WIC)	1 course
Students must earn a minimum C grade in the course.	
Upper-Division Requirement	39 credit hours
Students must successfully complete 39 upper-division (numbered 30000 to 49999) credit hours to graduate.	
Total Credit Hour Requirement	120 credit hours

Kent Core Requirements

Kent Core Composition (KCMP)	6
Kent Core Mathematics and Critical Reasoning (KMCR)	3
Kent Core Humanities and Fine Arts (KHUM/KFA) (min one course each)	9
Kent Core Social Sciences (KSS) (must be from two disciplines)	6
Kent Core Basic Sciences (KBS/KLAB) (must include one laboratory)	6-7
Kent Core Additional (KADL)	6
Total Credit Hours:	**36-37**

Program Learning Outcomes

Graduates of this program will be able to:

1. Identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics.

2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors.
3. Communicate effectively with a range of audiences.
4. Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in a global, economic, environmental and societal context.
5. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives.
6. Develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusions.
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.

The educational objectives of the program are the following:

1. Drive positive change in the community by engaging in careers in the field of cybersecurity, information systems and other engineering disciplines in a manner that promotes excellence and integrity.
2. Practice forward-thinking through continued education by way of graduate education, professional development and other continued self-motivated learning.
3. Successfully navigate the ever-changing trajectory of the world, practicing compassion as you strive to meet your personal career goals.

Full Description

The Bachelor of Science degree in Cybersecurity Engineering prepares students with problem-solving skills and a resourceful mindset to tackle cybersecurity threats in engineering systems. The program provides students with a working knowledge of analysis and evaluation of components and systems with respect to security and maintaining operations in the presence of risks and threats, with an emphasis on engineered systems. Students gain the understanding and skills necessary to address security issues pertaining to stakeholder needs and requirements (from a system engineering perspective) considering the lifecycle of the system from the outset. Design and development of systems, their components and associated networks to increase trustworthiness is a driving concern.

Applicants to this program should understand that this is a math-intensive program.