

# CYBERSECURITY ENGINEERING - B.S.

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

## Contact Information

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

## Fully Offered

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

## Examples of Possible Careers\*

### 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

#### \*Note

Source of occupation titles and labor data is 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.

## Description

The Bachelor of Science degree in Cybersecurity Engineering prepares future professional engineers in the broad field of cybersecurity. The program provides students with a working knowledge of analysis and evaluation of components and systems with respect to security and to 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. Information regarding the program's education objectives as well as enrollment and graduation data can be found on the college website.

## Admission Requirements

Admission to the Cybersecurity Engineering major is selective.

**Freshman Students:** Admission into the Cybersecurity Engineering major requires a minimum 3.0 high school GPA and a minimum 24 ACT composite score (minimum 24 ACT sub-scores in both English and mathematics) or a minimum 1160 SAT composite score (mathematics, critical reasoning and writing); and placement directly into MATH 12002 (or its equivalent). Students who do not meet these requirements may apply for admission to the Computer Engineering Technology major and request to change their program to the Cybersecurity Engineering major after their freshman year if they meet the following criteria: minimum 3.200 overall Kent State GPA and minimum B grade in both MATH 12002 and PHY 23101.

#### English Language Proficiency Requirements for International Students:

All international students must provide proof of English language proficiency (unless they meet specific exceptions) by earning a minimum 525 TOEFL score (71 on the Internet-based version), minimum 75 MELAB score, minimum 6.0 IELTS score, minimum 48 PTE score or minimum 100 DET score; or by completing the ESL level 112 Intensive Program. For more information on international admission, visit the Office of Global Education's admission website.

**Transfer Students:** Admission into the Cybersecurity Engineering major requires a minimum 12 credit hours in college-level coursework with a minimum 3.200 overall GPA and a minimum B grade in both MATH 12002 and PHY 23101 (or their equivalents). Transfer students who have completed less 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 and an ACT or SAT score.

## 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.

## 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.

Destination Kent State: First Year Experience	1
Course is not required for students with 25 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
Writing-Intensive Course (WIC)	1 course
Students must earn a minimum C grade in the course.	
Upper-Division Requirement	39
Students must successfully complete 39 upper-division (numbered 30000 to 49999) credit hours to graduate.	
Total Credit Hour Requirement	120

## Kent Core Requirements

Kent Core Composition (KCOMP)	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
<b>Total Credit Hours:</b>	<b>36-37</b>

## Program Requirements

### Major Requirements

Code	Title	Credit Hours
<b>Major Requirements (courses count in major GPA)</b>		
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 20000	PROFESSIONAL DEVELOPMENT IN ENGINEERING	1
ENGR 20005	INTRODUCTION TO CYBERSECURITY	3
ENGR 26301	NETWORKING HARDWARE I	4
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 36302	NETWORKING HARDWARE II	3
ENGR 36337	INFORMATION TECHNOLOGY SECURITY	3
ENGR 37777	CYBERSECURITY OPERATIONS	2
ENGR 37778	CYBERSECURITY OPERATIONS LABORATORY	1
ENGR 46300	NETWORK SECURITY	3
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)	3
ENGR 48199	ENGINEERING CAPSTONE II (ELR) (WIC) <sup>1</sup>	3
Engineering (ENGR) Upper-Division Elective (30000 or 40000 level)		3
<b>Additional Requirements (courses do not count in major GPA)</b>		
COMM 15000	INTRODUCTION TO HUMAN COMMUNICATION (KADL)	3
MATH 12002	ANALYTIC GEOMETRY AND CALCULUS I (KMCR) <sup>2</sup>	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 10097	DESTINATION KENT STATE: FIRST YEAR EXPERIENCE	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

<sup>1</sup> A minimum C grade must be earned to fulfill the writing-intensive requirement.

<sup>2</sup> Applicants to this program 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 fail to obtain the minimum score required to place into MATH 12002 are at risk of delaying graduation.

### 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
!	MATH 12002 ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
UC 10097	DESTINATION KENT STATE: FIRST YEAR EXPERIENCE	1
CS 13001 or CS 13011	COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING	4
and CS 13012	or COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING	
Kent Core Requirement		3
<b>Credit Hours</b>		<b>16</b>
Semester Two		
!	MATH 12003 ANALYTIC GEOMETRY AND CALCULUS II	5
ENGR 20005	INTRODUCTION TO CYBERSECURITY	3
Kent Core Requirement		3
Kent Core Requirement		3
Kent Core Requirement		3
<b>Credit Hours</b>		<b>17</b>
Semester Three		
ENGR 27100	FUNDAMENTALS OF OPERATING SYSTEMS FOR ENGINEERING	3
MATH 32051	MATHEMATICAL METHODS IN THE PHYSICAL SCIENCES I	4
ENGR 20000	PROFESSIONAL DEVELOPMENT IN ENGINEERING	1
PHY 23101	GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)	5
Kent Core Requirement		3
<b>Credit Hours</b>		<b>16</b>
Semester Four		
CS 23001	COMPUTER SCIENCE II: DATA STRUCTURES AND ABSTRACTION	4
PHY 23102	GENERAL UNIVERSITY PHYSICS II (KBS) (KLAB)	5
CS 23022	DISCRETE STRUCTURES FOR COMPUTER SCIENCE	3
Kent Core Requirement		3
<b>Credit Hours</b>		<b>15</b>
Semester Five		
ENGR 26301	NETWORKING HARDWARE I	4
!	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
<b>Credit Hours</b>		<b>14</b>
Semester Six		
CS 47221	INTRODUCTION TO CRYPTOLOGY	3
ENGR 36302	NETWORKING HARDWARE II	3
ENGR 47200	SYSTEMS ENGINEERING	3
ENGR 37777	CYBERSECURITY OPERATIONS	2
ENGR 37778	CYBERSECURITY OPERATIONS LABORATORY	1
Kent Core Requirement		3
<b>Credit Hours</b>		<b>15</b>

Semester Seven		
CS 47207	DIGITAL FORENSICS	3
ENGR 46316	SERVER ADMINISTRATION AND CONFIGURATION I	3
ENGR 48099	ENGINEERING CAPSTONE I (ELR)	3
ENGR 35550	LAW AND ETHICS FOR ENGINEERS	3
Engineering (ENGR) Upper-Division Elective (30000 or 40000 level)		3
<b>Credit Hours</b>		<b>15</b>
Semester Eight		
ENGR 33320	APPLIED EMBEDDED SYSTEMS I	3
ENGR 46300	NETWORK SECURITY	3
ENGR 48199	ENGINEERING CAPSTONE II (ELR) (WIC)	3
ENGR 46312	WIRELESS NETWORK AND TELECOMMUNICATION SYSTEMS	3
Kent Core Requirement		3
<b>Credit Hours</b>		<b>15</b>
<b>Minimum Total Credit Hours:</b>		<b>123</b>