

BACHELOR OF SCIENCE IN COMPUTER AND CYBERSECURITY ENGINEERING

The Bachelor of Science in Computer and Cybersecurity Engineering (CCSE) is a degree program that prepares students for an engineering career that involves design and application of secure and resilient computer hardware and software systems. This is a unique program that combines computer engineering and cybersecurity topics into one major. The program emphasizes the cybersecurity engineering of cyber-physical systems which are becoming more prevalent every day. It is concerned with detection and elimination of vulnerabilities and the safe operation of the Internet of Things, cloud computing, healthcare, smart/micro grid power systems, computer networks, and wireless communications.

Curriculum

Required Courses

Code	Title	Credit Hours
Computer and Cyber Security Engineering Requirements		(47)
ECE 100	Introduction to the Profession I	3
ECE 211	Circuit Analysis I	3
ECE 213	Circuit Analysis II	4
ECE 218	Digital Systems	4
ECE 222	Introduction to Cybersecurity Engineering	3
ECE 242	Digital Computers and Computing	3
ECE 308	Signals and Systems	3
ECE 311	Engineering Electronics	4
ECE 407	Introduction to Computer Networks with Laboratory	4
ECE 441	Smart and Connected Embedded System Design	4
ECE 443	Introduction to Computer Cyber Security	3
or CS 458	Introduction to Information Security	
ECE 444	Computer Network Security	3
ECE 485	Computer Organization and Design	3
ECE 497	Special Problems ¹	3
Computer Science Major Requirements		(16)
CS 115	Object-Oriented Programming I	2
CS 116	Object-Oriented Programming II	2
CS 330	Discrete Structures	3
CS 331	Data Structures and Algorithms	3
CS 351	Systems Programming	3
CS 450	Operating Systems	3
Cybersecurity Software Engineering Elective		(3)
Choose one from the following courses:		3
ECE 442	Internet of Things and Cyber Physical Systems	3
ECE 448	Application Software Design	3
ECE 449	Object-Oriented Programming and Machine Learning	3
ECE 473	Cloud Computing and Cloud Native Systems	3
Cybersecurity Law Elective		(2-3)
Select two to three credit hours from the following courses:		2-3
LAW 252	Law of Privacy	3
LAW 285	Cyber Fraud-Priv Class Actions	2
LAW 295	Data Privacy and Security	2
LAW 379	Blockchain and the Law	2
LAW 478	Computer & Network Privacy	3
Mathematics Requirements		(24)
MATH 151	Calculus I	5
MATH 152	Calculus II	5

MATH 251	Multivariate and Vector Calculus	4
MATH 252	Introduction to Differential Equations	4
MATH 333	Matrix Algebra and Complex Variables	3
MATH 374	Probability and Statistics for Electrical and Computer Engineers	3
Physics Requirements		(8)
PHYS 123	General Physics I: Mechanics	4
PHYS 221	General Physics II: Electricity and Magnetism	4
Chemistry Requirement		(3)
CHEM 122	Principles of Chemistry I Without Laboratory	3
Career Elective		(3)²
Career Elective I		3
Interprofessional Projects (IPRO)		(6)
See Illinois Tech Core Curriculum, section E		6
Humanities and Social Sciences Requirements		(21)
See Illinois Tech Core Curriculum, sections B and C		21
Total Credit Hours		133-134

Minimum degree credits required: 133

¹ ECE 497 with a project related to cyber security topics such as smart grid, Internet of Things, cloud computing, hardware security, or cryptography. Please see your academic adviser for more details.

² Career Electives: Advisor-approved course from engineering, science, math, computer science, business, and law that is the same level or more advanced than the academic level of the student.

Bachelor of Science in Computer and Cybersecurity Engineering Curriculum

		Year 1	
Semester 1	Credit Hours	Semester 2	Credit Hours
ECE 100	3	MATH 152	5
MATH 151	5	PHYS 123	4
CHEM 122	3	Career Elective I ¹	3
CS 115	2	CS 116	2
Humanities 200-level	3	Social Sciences Elective	3
16		17	
		Year 2	
Semester 1	Credit Hours	Semester 2	Credit Hours
MATH 252	4	MATH 251	4
PHYS 221	4	ECE 213	4
ECE 211	3	ECE 222	3
ECE 218	4	ECE 242	3
CS 331	3	CS 330	3
18		17	
		Year 3	
Semester 1	Credit Hours	Semester 2	Credit Hours
ECE 308	3	CS 450	3
ECE 311	4	ECE 407	4
CS 351	3	MATH 333 or 350	3
ECE 443	3	I PRO Elective I	3
Humanities Elective (300+)	3	Social Sciences Elective (300+)	3
16		16	
		Year 4	
Semester 1	Credit Hours	Semester 2	Credit Hours
ECE 497	3	ECE 441 ³	4
ECE 485	3	Cybersecurity Software Engineering Elective ⁴	3
MATH 374	3	ECE 444	3
I PRO Elective II	3	Cyber Security Law Elective ⁵	2-3
Humanities (300+)	3	Social Sciences Elective (300+)	3
Additional Hum. or Soc. Sci. Elective	3		
18		15-16	

Total Credit Hours: 133-134

- ¹ Career Electives: Advisor-approved course from engineering, science, math, computer science, business, and law that is more advanced than the academic level of the student.
- ² ECE 497 with a project related to cyber security topics such as smart grid, Internet of Things, cloud computing, hardware security, or cryptography. Please see your academic adviser for more details.
- ³ Major Design Experience (M) course.
- ⁴ Choose from the following courses: ECE 442, ECE 448, ECE 449, and ECE 473
- ⁵ Choose from the following courses: LAW 252, LAW 285, LAW 295, LAW 379 or LAW 478.