



CodeHS

Introduction to Cybersecurity Syllabus

Alberti: One Semester for High School

(90 contact hours)

Course Overview and Goals

As our world becomes increasingly dependent on technology, cybersecurity is a topic of growing importance. It is crucial that companies and individuals take precautions to protect themselves from the growing threat of cyber attacks. This course prepares students with crucial skills to be responsible citizens in a digital future.

The Introduction to Cybersecurity is the first online blended K12 cybersecurity course. The Alberti semester version is designed for students with no background in computer science and there are no specific course prerequisites. Students will learn foundational cybersecurity topics and digital citizenship and cyber hygiene all through the CodeHS web-based platform. Students will complete a culminating course project where they will create a public service announcement. This is not a coding intensive course, but rather students will learn the basics of protecting their own data and become aware of how cybersecurity is important for the information age in which we live.

Learning Environment: The course utilizes a blended classroom approach. The content is a mix of web-based and physical activities. Students will investigate cyber related topics and reflect on them and discuss them, create digital presentations, and engage in in-person collaborative exercises with classmates. Teachers utilize tools and resources provided by CodeHS to leverage time in the classroom and give focused 1-on-1 attention to students.

Quizzes: Each lesson includes at least one formative short multiple choice quiz. At the end of each module, students take a summative multiple choice quiz that assesses their knowledge of the concepts covered in the module.

Prerequisites: The Introduction to Cybersecurity (Alberti) course is designed for high school students with no previous CS background. The course is highly visual, dynamic, and interactive, making it engaging for those new to computer science.

More information: Browse the content of this course at <https://codehs.com/course/6145>

Course Breakdown

Module 1: What is Cybersecurity? (4 weeks/20 hours)

This module gives an introduction to cybersecurity. It focuses on why cybersecurity is important, recent threats to cybersecurity, and different careers in the field.

Browse the full content of this module at <https://codehs.com/library/course/6145/module/8712>

<p>Objectives / Topics Covered</p>	<ul style="list-style-type: none"> ● Course Overview ● What is Cybersecurity? ● Impact of Cybersecurity ● The CIA Triad
<p>Example Assignments / Labs</p>	<ul style="list-style-type: none"> ● Course Overview <ul style="list-style-type: none"> ○ Do you use the Internet? ○ How do you use the Internet? ○ What kinds of information are at risk? ○ What are some different CS career fields? ○ Coding as the new literacy ○ What is this course about? ○ Example activity: <ul style="list-style-type: none"> ■ Lists steps to take to protect yourself on the Internet ■ What is something you want to know or make by the end of the course? ● What is Cybersecurity? <ul style="list-style-type: none"> ○ Cybersecurity defined ○ Why is cybersecurity important? ○ Cybersecurity in the news ○ Cybersecurity and IoT (Internet of Things) ○ How do we prevent cyber attacks? ○ Example activities: <ul style="list-style-type: none"> ■ Summarize and discuss recent cyber attacks ■ Explore a threat map to see where cyber attacks are coming from and which countries are being targeted ● Impact of Cybersecurity <ul style="list-style-type: none"> ○ Why do we care about cybersecurity? ○ What information is at risk? ○ What are the impacts of cyber attacks? <ul style="list-style-type: none"> ■ Financial impact ○ Cybersecurity workforce ○ What are current cybersecurity career? ○ Example activities: <ul style="list-style-type: none"> ■ Review resources and reflect on or discuss <ul style="list-style-type: none"> ● What information do cyber criminals

	<ul style="list-style-type: none"> steal? ● What do cyber criminals do with stolen information? ● The CIA Triad <ul style="list-style-type: none"> ○ What is the CIA triad? (confidentiality, integrity, availability) ○ What are “secure systems?” ○ What do confidentiality, integrity, and availability mean in cybersecurity? ○ Example activities: <ul style="list-style-type: none"> ■ Determine where scenarios break part of the CIA Triad
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Module 2: Digital Citizenship and Cyber Hygiene (10 weeks/50 hours)

This module includes topics on Internet etiquette and how to stay safe on the world wide web. We will also look at the potential effects of our digital footprints, how to protect information from online risks, and the implications of cyberbullying. Finally, the module includes how to find and cite quality resources online.

Browse the full content of this module at <https://codehs.com/library/course/6145/module/8713>

<p>Objectives / Topics Covered</p>	<ul style="list-style-type: none"> ● Digital Footprint and Reputation ● Cyberbullying ● Internet Safety ● Privacy and Security ● Information Literacy ● Creative Credit and Copyright ● Hacking Ethics
<p>Example Assignments / Labs</p>	<ul style="list-style-type: none"> ● Digital Footprint and Reputation <ul style="list-style-type: none"> ○ What is a digital footprint? ○ What is your digital footprint and reputation? ○ What does it mean that the internet is public and permanent? ○ Who looks at your digital footprint and reputation? ○ What are some recommended social media guidelines? ○ How can you maintain your digital footprint? ○ What does your digital footprint say about you? ○ Example activities: <ul style="list-style-type: none"> ■ What is your digital footprint? ■ Are you going to make any changes in what you post on social media? ● Cyberbullying <ul style="list-style-type: none"> ○ What is cyberbullying? ○ What are the impacts of cyberbullying? ○ Are there cyberbullying roles? ○ What do you do if you are being bullied?

- What do you do if you see bullying?
- How can you be an upstander?
- Example activities:
 - Explore cyberbullying scenarios: What would you do?
- Internet Safety
 - What are some ways to stay safe online?
 - What are some online safety guidelines?
 - Example activities:
 - Explore Internet safety scenarios: What would you do?
- Privacy and Security
 - What are data privacy and security?
 - How can you keep personal data secure and private?
 - What can happen if you data is stolen and what can you do about it?
 - Example activities:
 - Test out various passwords on a site
 - Explore Google's privacy policy: What do they know about you?
- Information Literacy
 - What is information literacy?
 - How can you do effective internet searches?
 - What are some techniques for judging source legitimacy and identifying misinformation?
 - Example activities:
 - Create and test search queries
 - Explore evidence for using sources
- Creative Credit and Copyright
 - What is copyright?
 - What are the different types of copyright licenses
 - Example activities:
 - Create citations for sources
 - Explore image search tools
- Hacking Ethics
 - What are hackers?
 - Are there different kinds of hackers? (white, black, grey)
 - What are bug bounty programs?
 - Is hacking always illegal?
 - What are the consequences of illegal hacking?
 - Example activities:
 - Explore what penetration testing is
 - Sign ethical hacker agreement
- Final project: Create a Public Service Announcement
 - Create a Public Service Announcement (PSA) to teach your peers about your selected topic in digital

	<p>citizenship and cyber hygiene. You can select any of the topics covered in this module. Be creative and make it fun! You could make a video, song, poster, or slideshow.</p>
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Module 3: The ABCs of Cryptography (7 weeks/35 hours)

In this module, we will dive into the history of cryptography systems, the motivation behind using encryption systems, and basic cryptography systems. Additionally, we will explore topics on how to use cryptography, cryptology, and cryptanalysis to decode a message without the use of a key. Finally, we will look into more advanced cryptographic topics like public key cryptography and hash functions.

Browse the full content of this module at <https://codehs.com/library/course/6145/module/8714>

<p>Objectives / Topics Covered</p>	<ul style="list-style-type: none"> ● Cryptography, Cryptology, Cryptanalysis ● History of Cryptography ● Why do we Need to Encrypt Data? ● Basic Cryptography Systems: Caesar Cipher ● Basic Cryptography Systems: Cracking the Caesar Cipher ● Basic Cryptography Systems: Vigenère Cipher ● Advanced Cryptography ● Hash Functions ● Hash Function Development
<p>Example Assignments / Labs</p>	<ul style="list-style-type: none"> ● Cryptography, Cryptology, Cryptanalysis <ul style="list-style-type: none"> ○ Why do we need some secrecy in our transparent information age? ○ Explain general encryption with data, keys ○ Example activities: <ul style="list-style-type: none"> ■ Video and discussion on securing the cloud ■ Passing notes in class (offline activity) ● History of Cryptography <ul style="list-style-type: none"> ○ Why do we encrypt? ○ What are some classic encryption techniques? ○ What is the flaw in substitution ciphers? ○ What was The Enigma during WW2? ○ What is modern cryptography and how has cryptography changed over time? ○ What is 256-bit key encryption and how does this help cryptography overall? ○ Example activities: <ul style="list-style-type: none"> ■ How did the Enigma work? ● Why do we Need to Encrypt Data? <ul style="list-style-type: none"> ○ Explore the CIA Triad and encryption ○ Example activities: <ul style="list-style-type: none"> ■ Telephone game with math (offline) ■ Modulo math activity sheet

- Basic Cryptography Systems: Caesar Cipher
 - Explore examples of the Caesar cipher
 - Example activities:
 - Practice with a Caesar Cipher JavaScript program
 - Modify the program to create the decrypting Caesar program
- Basic Cryptography Systems: Cracking the Caesar Cipher
 - How do we solve the Caesar Cipher with brute force and using letter frequency analysis?
 - Example activities:
 - Practice cracking Caesar Cipher with brute force
 - Practice cracking Caesar Cipher with letter frequency
- Basic Cryptography Systems: Vigenère Cipher
 - Explore examples of the Vigenère Cipher
 - Example activities:
 - Practice with a Vigenère Cipher JavaScript program
- Advanced Cryptography
 - What are the problems with Caesar cipher? (History recap)
 - What does today's cryptography look like?
 - What does "hard vs. easy problems to crack" mean?
 - What kinds of encryption are there? (symmetric, asymmetric, public key)
 - Example activities:
 - Discuss resources related to public key cryptography
- Hash Functions
 - What is cryptographic hashing?
 - How is hashing used?
 - What is a hash function? Why are hash functions used?
 - What does the ideal hash function do?
 - How do attackers try to crack a hashing algorithm?
 - Example activities:
 - Use a hash generator to create hashes for various input
- Hash Function Development
 - How can we prevent hash function cracking?
 - Why is modulo math so important for hash programs?
 - Example activities:
 - Practice modulo math problems (offline)
 - Test a simple hash program
- Final project: Develop a hash program
 - Modify a hash function program with new math to

	<p>create different hashes for the same inputs. Explain how your new program works and show before and after results for 3 different input strings that the new hash function changed the hash created.</p>
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Module 4: Create a PSA Final Project (1 week/5 hours)

In this final project module, students will choose one topic they have learned about, and create a public service announcement that targets members of their community.

Browse the full content of this module at <https://codehs.com/library/course/6145/module/8681>

<p>Objectives / Topics Covered</p>	<p>Final project</p>
<p>Example Assignments / Labs</p>	<ul style="list-style-type: none"> ● Final course project: Create a Public Service Announcement <ul style="list-style-type: none"> ○ Create a Public Service Announcement (PSA) to teach your peers about your selected topic in digital citizenship and cyber hygiene. You can select any of the topics covered in this module. Be creative and make it fun! You could make a video, song, poster, or slideshow.