Alabama DLCS 9-12 Grade Syllabus

High School - course length (150 hours)

Course Overview and Goals

The CodeHS Alabama Digital Literacy and Computer Science 9-12 curriculum prepares high school students for success in a digital world by developing skills across a broad range of computing disciplines. Students explore topics including cybersecurity, computing systems, IT infrastructure, programming in Python, data structures, data science, and artificial intelligence. Upon completing this course, students will have developed the computational thinking, technical skills, and digital literacy necessary for college and career readiness in technology-related fields.

Learning Environment

The course utilizes a blended classroom approach. The content is fully web-based, with students writing and running code in the browser. Teachers utilize tools and resources provided by CodeHS to leverage time in the classroom and give focused 1-on-1 attention to students. Each unit of the course is broken down into lessons. Lessons consist of video tutorials, short quizzes, example programs to explore, and written programming exercises, adding up to over 100 hours of hands-on programming practice in total. Each unit ends with a comprehensive unit test that assesses students' mastery of the material from that unit as well as challenge problems where students can display their understanding of the material.

Development Environment

Students write and run Python programs in the browser using the CodeHS editor.

Prerequisites

The Alabama Digital Literacy and Computer Science 9-12 course is designed for high school students in grades 9-12. Students who have completed the Alabama Digital Literacy and Computer Science courses at the middle school level will have a helpful foundation, but no prior computer science experience is required to enroll in this course.

Technology Requirements

To complete all activities and exercises in this course, students must have access to the 3rd party sites and tools listed here: Course Whitelist

More Information

Browse the content of this course at https://codehs.com/course/28156/explore

Course Breakdown

Module 1: Cybersecurity and You (3 weeks / 15 hours)

In this module, students explore the impacts of being online and develop skills to protect themselves and others in digital spaces. Students examine digital footprints, personal data collection, information literacy, cyber ethics, and common cyber threats and how to defend against them.

Topics Covered	• Digital Footprint and Responsibility • Personal Data and Collection • Information Literacy • Cyber Ethics and Laws • Personal Data Security • Cybersecurity Essentials (AAA Framework and CIA Triad) • Common Cyber Attacks and Prevention

Example Assignments	• Digital Footprint Reflection
	  ○ Students explore how social media use contributes to their digital footprint and examine real-world examples of social media screenings.
	• What Google Does with Your Data
	  ○ Students watch a video and reflect on how companies collect and use personal data, and consider the implications of location tracking and privacy policies.
	• A Tale of Authentication
	  ○ Students read an article and evaluate different authentication methods and their security tradeoffs.
	• Phishing for Your Info
	  ○ Students practice identifying phishing attempts and respond to a simulated phishing scenario.

Module 2: Computing Systems (3 weeks / 15 hours)

In this module, students investigate the history and organization of computers, explore the functions of operating systems, and examine how software is installed, licensed, and secured. Students also explore advanced topics including alternative computing architectures and data compression.

Topics Covered	• History of Computers • Computer Organization (hardware components and input/output) • Operating Systems (types, updates, and upgrades) • File Systems • Compatibility • Software and Applications • Software Licenses • Application Security • System Administration and User Permissions • Health Impacts of Technology • Alternative Computing Architectures (classical, cluster, and quantum) • Compressing Data
Example Assignments	• **Mission: Who Invented the Computer?** ○ Students research and present evidence on key figures in computing history including Charles Babbage, Ada Lovelace, Alan

	Turing, and the ENIAC programmers. ● **Lab: Configuring a Computer** ○ Students personalize computer settings and practice troubleshooting display, sound, and storage configurations. ● **Which OS is Right for You?** ○ Students compare Windows, macOS, and Linux and select the best operating system for a given scenario.

Module 3: IT Concepts (2 weeks / 10 hours)

In this module, students explore how the internet and networks function, from foundational internet protocols to physical networking hardware. Students examine how data travels across networks and how network administrators monitor and secure connections.

Topics Covered	● What is the Internet? ● IP Addresses ● Routing and Packets ● Impact of the Internet on Society ● Internal Components (CPU, GPU, motherboard, firmware) ● Peripheral Devices ● Network Devices ● Network Types and Wireless Standards ● Ports, Protocols, and Firewalls ● Network Management and CLI Commands
Example Assignments	● **Routing and Packets** ○ Students trace how messages travel across the internet using open protocols and explore packet structure. ● **Impact of the Internet** ○ Students use the Compass Points thinking routine to evaluate the social, educational, and personal effects of internet access on society. ● **Network Management** ○ Students use CLI commands to retrieve network information and analyze connection logs to identify suspicious activity.

Module 4: Project: IT Professional (1 week / 5 hours)

In this project module, students apply their knowledge of computing systems and IT concepts in professional scenarios. Students develop the communication, troubleshooting, and knowledge-sharing skills needed to work effectively as IT professionals.

Topics Covered	● Cybersecurity and IT Career Paths ● Customer Communication ● Troubleshooting Methodology ● Technical Writing (Knowledge Base Articles) ● Instructional Video Production
Example Assignments	● **Troubleshooting Simulation** ○ Students work through simulated IT support scenarios using a systematic troubleshooting methodology to identify problems and verify solutions.

	• **Building a Knowledge Base**
	  ○ Students research a common network issue and write a knowledge base article explaining how to resolve it for end users.
	• **Star in a Video!**
	  ○ Students plan, script, and record an instructional video on a technology topic of their choosing.

Module 5: Python Fundamentals (6 weeks / 30 hours)

In this module, students learn the core concepts of programming in Python, from printing and variables to functions, testing, and simulation. Students build a strong programming foundation by applying computational thinking to solve real-world problems and writing programs that interact with users through input and output.

Topics Covered	• Computational Thinking • Printing in Python • Variables and Types • User Input • Mathematical Operators • String Operators • Comments and Code Readability • Refactoring for Readability • Functions, Parameters, and Return Values • Levels of Abstraction • Testing Your Code • Debugging Strategies • Simulation • Indexing and Slicing

Example Assignments	• **Introduce Yourself**
	  ○ Students write a program that prints their name and something they enjoy.
	• **Birthday Candles**
	  ○ Students write a program that asks a user their age and calculates the number of birthday candles they will need.
	• **Rectangle**
	  ○ Students create variables for a rectangle's length and width and compute its area and perimeter.
	• **Simulation**
	  ○ Students explore simulations of gravity and Conway's Game of Life to understand how programs can model real-world phenomena.

Module 6: Data Structures and Algorithms (3 weeks / 15 hours)

In this module, students explore fundamental data structures and algorithms in Python. Students learn to store and manipulate data using tuples, lists, and dictionaries, and study classic searching algorithms along with methods for analyzing and comparing algorithm efficiency.

Topics Covered	• Tuples and Lists • List Methods • Dictionaries

	• Comparing Data Structures • Algorithm Fundamentals • Algorithm Efficiency and Big O Notation • Linear Search • Binary Search

Example Assignments	• **Librarian**
	  ○ Students ask a user for book authors' last names and print them in sorted order.
	• **Phone Book**
	  ○ Students build a dictionary-based phone book that stores and retrieves entries by name.
	• **Draft Day Search**
	  ○ Students build a fantasy football draft tool using linear search to find and add available players.
	• **Linear vs Binary Search**
	  ○ Students compare the efficiency of linear and binary search by counting comparisons made on the same dataset.

Module 7: Project: Software Development (1 weeks / 5 hours)

In this project module, students apply the Software Development Life Cycle to design, build, and test an original application. Students learn about digital accessibility standards and use iterative development to incorporate user feedback into a polished final product.

Topics Covered	• ADA Standards and Digital Accessibility Barriers • WCAG Principles • Software Development Life Cycle (SDLC) • Program Design and Pseudocode • Development, Testing, and Iterative Improvement • Deployment

Example Assignments	• **Console Program Usability Review**
	  ○ Students evaluate a tip calculator program for usability issues and apply WCAG principles to suggest improvements.
	• **Program Your App (Versions 1 and 2)**
	  ○ Students convert pseudocode into a working Python program that solves a real-world problem, gather user testing feedback, and submit a final improved version.

Module 8: The Data Science Life Cycle (3 weeks / 15 hours)

In this module, students learn and apply the data science life cycle using spreadsheet tools. Students collect and clean real-world data, create visualizations, and apply statistical measures to draw and communicate insights.

Topics Covered	• What is Data Science? • Types of Statistical Questions • Data Collection and Storage • The Data Science Life Cycle • Spreadsheet Basics (Google Sheets)

	• Data Cleaning • Sorting and Filtering • Data Visualizations • Interactive Visualizations • Pivot Tables • Statistical Measures (Mean, Median, Mode)

Example Assignments	• **Data Sort**
	  ○ Students classify data categories as quantitative or qualitative and organize them in a structured dataset.
	• **Cleaning a Dataset**
	  ○ Students identify and remove duplicate entries, fix formatting errors, and filter out irrelevant data using spreadsheet functions.
	• **Data Visualizations**
	  ○ Students create charts in Google Sheets to represent a real-world dataset and interpret trends.
	• **Statistical Measures**
	  ○ Students apply mean, median, and mode to a dataset and write conclusions based on their findings.

Module 9: Project: Data Dashboard (1 week / 5 hours)

In this project, students apply the full data science life cycle to create an interactive data dashboard. Students select a topic of interest, collect and clean a dataset, produce visualizations, and present their findings to their peers.

Topics Covered	• The Data Science Life Cycle (Applied) • Data Collection and Cleaning • Creating Interactive Visualizations • Presenting Data Findings
Example Assignments	• **Data Dashboard Project** ○ Students select a real-world topic, gather and clean their own dataset, build an interactive dashboard using Google Sheets, and present their analysis and conclusions to the class.

Module 10: Intro to AI and Machine Learning (3 weeks / 15 hours)

In this module, students explore the fundamentals of artificial intelligence and machine learning. Students examine how different AI systems work, learn to use AI tools responsibly, and investigate how machine learning models are trained, evaluated, and improved.

Topics Covered	• Safe and Responsible Use of AI Tools • Human vs. Artificial Intelligence • Generative vs. Predictive AI • Large Language Models • Prompt Engineering • AI Bias, Ethics, and Who Builds AI • Introduction to Machine Learning • Supervised Learning

	• Unsupervised Learning • Reinforcement Learning • Data's Role in Machine Learning • Improving a Model •

Example Assignments	• **Prompt Practice**
	  ○ Students write and refine prompts for an AI system, evaluating how audience, clarity, and tone affect the quality of outputs.
	• **Your Website**
	  ○ Students copy and deploy AI-generated web code and evaluate the accuracy and limitations of the output.
	• **Teachable Machine**
	  ○ Students train a supervised learning model using Google's Teachable Machine and reflect on how training data affects model accuracy.
	• **Project: Build a Sorting Machine**
	  ○ Students model supervised and unsupervised learning by designing a sorting machine that classifies data with and without labels.

Module 11: Risks of AI (2 weeks / 10 hours)

In this module, students examine the societal risks and ethical implications of artificial intelligence. Students investigate AI bias, misinformation, data privacy, environmental impact, and governance, and engage in projects that challenge them to think critically about AI's role in the world.

Topics Covered	• Effects of Using Biased AI • Hallucinations and Security Risks • Deepfakes and Misinformation • Digital Footprint and AI • Data Privacy and Personalization Tradeoffs • Environmental Impacts of AI • AI Governance and Regulation (EU AI Act)

Example Assignments	• **Project: AI on Trial**
	  ○ Students engage in a structured mock trial debate about the societal implications of AI, drawing on research about real AI lawsuits and controversies.
	• **Pros and Cons One-Pager**
	  ○ Students research the environmental impact of AI data centers and present their perspective in a structured one-page brief.
	• **AI Policy Draft**
	  ○ Students draft, peer-review, and revise an AI governance policy proposal modeled on global regulatory frameworks.
	• **Project: Designing a Responsible AI Future**
	  ○ Students identify a specific AI risk and develop a proposal for addressing it for a defined audience.

Module 12: Careers (1 week / 5 hours)

In this module, students explore how AI is transforming industries and career paths. Students investigate roles in the AI and technology fields, use AI tools to support career planning, and complete a project examining what the future of work looks like in an AI-driven economy.

Topics Covered	● AI Across Industries ● AI and Human Collaboration ● Careers in AI (Machine Learning Engineer, Data Scientist, and emerging roles) ● Cover Letter Writing with AI Assistance ● Future of Work
Example Assignments	● **Spend a Day as an ML Engineer / Data Scientist** ○ Students explore the daily responsibilities of AI professionals through interactive role-based simulations. ● **Ask AI to Help Write Your Cover Letter** ○ Students use an AI writing tool to draft a cover letter for a job posting of interest and reflect on AI's strengths and limitations as a writing assistant. ● **Project: Future of Work** ○ Students research the impact of AI on a career of their choice and create a deliverable presenting their findings in a virtual career fair format.