Mississippi CTE

# Cyber Foundations II (2025)

## Orientation, Digital Citizenship, and Keyboarding 1

1 **Understand school policies, program policies, and safety procedures related to Cyber Foundations II.** 1.1

- a Review the school handbook, the technology acceptable use policy, and other safety procedures for building-level situations. 1.1.A
- b Examine the course outline and discuss its relevance in today's workforce. 1.1.B
- c Demonstrate appropriate safety measures related to technology in the computer lab and online environments. 1.1.C
- d Ensure students master the safety test with 100% proficiency. 1.1.D

2 **Explore social and ethical issues related to digital citizenship, social media, and artificial intelligence (AI).** 1.2

- a Analyze personal media habits and evaluate how much time is spent with different forms of media. 1.2.A
- b Debate the pros and cons of social media when used personally, educationally, and professionally. 1.2.B
- c Assess user responsibilities to respect others' creative work. 1.2.C
- d Develop strategies to determine inappropriate contact and foster positive interactions when collaborating online. 1.2.D
- e Reflect on the outcomes of creating different online personalities. 1.2.E
- f Investigate cyberbullying behaviors and their impact on individuals and communities. 1.2.F
- g Discuss the ethical use of AI in digital interactions and its impact on society. 1.2.G
- h Conduct in-depth analysis and discussion on complex social media issues, focusing on ethical and legal implications. 1.2.H
- i Examine and debate the ethical considerations and ramifications of AI technologies in digital communications. 1.2.I
- j Formulate and promote strategies for fostering positive online interactions and addressing cyberbullying effectively. 1.2.J

3 **Facilitate effective collaboration using learning management systems (LMS). DOK3** 1.3

- a Engage in online learning methodologies, including collaborative projects and peer evaluations. 1.3.A

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b Improve professional digital communication skills, ensuring clarity, etiquette, and effectiveness in virtual interactions. 1.3.B

4 **Enhance and evaluate keyboarding skills. DOK2** 1.4

a Develop touch typing techniques to increase accuracy and speed. 1.4.A

b Demonstrate proper posture and hand placement for effective typing. 1.4.B

c Practice typing regularly to improve proficiency. 1.4.C

d Utilize keyboard shortcuts to enhance productivity. 1.4.D

e Master advanced typing techniques and utilize efficient keyboard shortcuts to improve productivity. 1.4.E

f Implement regular assessments to monitor and enhance typing speed and accuracy. 1.4.F

5 **Investigate and correlate career opportunities with digital skills across CTE career pathways. DOK3** 1.5

a Conduct comprehensive research and present detailed analyses on career paths within various Mississippi career clusters. 1.5.A

b Explore the integration of digital skills in diverse industries, illustrating the relevance and application of these competencies in real-world CTE career pathways. 1.5.B

**Student Organizations, Leadership, and Career** 2

1 **Understand the structure and function of student organizations. DOK3** 2.1

a Analyze the various roles and responsibilities of student organizations. 2.1.A

b Discuss the benefits of participation in student organizations for personal and professional development. 2.1.B

2 **Develop and apply leadership skills within student organizations. DOK3** 2.2

a Demonstrate effective leadership strategies in student organization activities. 2.2.A

b Implement and manage projects or events within student organizations, showcasing leadership and teamwork. 2.2.B

3 **Connect participation in student organizations to career pathways. DOK3** 2.3

a Investigate how skills developed through student organizations relate to career pathways in Mississippi's CTE clusters. 2.3.A

b Present case studies or examples of professionals who have benefited from their involvement in student organizations. 2.3.B

**21st Century Toolbox** 3

1 **Master advanced digital tools for organization and productivity. DOK3** 3.1

a Utilize advanced features of digital calendars, note-taking apps, and project management tools to enhance organization and productivity. 3.1.A

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b Demonstrate the ability to integrate multiple digital tools to streamline workflows and manage tasks efficiently. 3.1.B

2 **Develop proficiency in digital collaboration tools. DOK3** 3.2

- a Explore and apply advanced functionalities of collaboration tools such as cloud-based platforms, shared documents, and communication apps. 3.2.A
- b Engage in collaborative projects using digital tools, showcasing effective teamwork and communication. 3.2.B

3 **Enhance digital communication skills. DOK3** 3.3

- a Practice advanced techniques in digital communication, including email etiquette, professional messaging, and virtual meeting protocols. 3.3.A
- b Create and present digital content using various media formats to communicate ideas clearly and effectively. 3.3.B

4 **Demonstrate knowledge of 21st-century skills, including ethical AI and data use. DOK3** 3.4

- a Collaborate effectively with peers on projects and assignments, showcasing teamwork and communication skills. 3.4.A
- b Demonstrate creativity and imagination in problem-solving scenarios. 3.4.B
- c Utilize critical thinking to analyze and solve complex problems. 3.4.C
- d Apply problem-solving techniques to various scenarios, emphasizing ethical considerations in AI and data use. 3.4.D

5 **Explore career pathways through career exploration activities. DOK2** 3.5

- a Research and identify career pathways within various Mississippi career clusters, understanding the required 21st-century skills. 3.5.A
- b Discuss the application of these skills to different career paths, emphasizing how they enhance career readiness 3.5.B

6 **Update and refine an Individual Success Plan (ISP) to align with career interests and educational goals. DOK2** 3.6

- a Identify the basic components of the ISP, linking it to the 14 national career clusters and to secondary and postsecondary education. 3.6.A
- b Select and print courses that meet graduation requirements and reflect the ISP, ensuring alignment with career goals. 3.6.B

**Block- Based Coding** 4

1 **Reinforce and apply block-based programming concepts. DOK3** 4.1

- a Review and strengthen understanding of basic and intermediate block-based programming concepts. 4.1.A
- b Apply these concepts to develop increasingly complex algorithms and interactive applications. 4.1.B

**eview, revisit, and remediate key programming concepts. DOK2** 4.2

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a Conduct thorough reviews of previously covered material to identify and address any gaps in understanding. 4.2.A

b Revisit challenging concepts and provide targeted remediation to ensure mastery. 4.2.B

3 **Prepare for transition to text-based programming. DOK2** 4.3

a Introduce foundational concepts essential for success in text-based programming. 4.3.A

b Create a seamless transition by demonstrating how block-based concepts translate to text-based coding environments. 4.3.B

**Text-Based Programming** 5

1 **Understand and apply fundamental concepts of text-based programming. DOK3** 5.1

a Master the basic concepts and syntax of text-based programming languages. 5.1.A

b Develop and structure code to solve problems effectively. 5.1.B

2 **Develop and utilize advanced programming structures. DOK3** 5.2

a Create and manipulate variables to store and manage data. 5.2.A

b Implement flow control mechanisms such as conditionals to direct program logic. 5.2.B

c Use loops for repetition and iteration in programs. 5.2.C

d Develop and utilize functions to modularize and simplify code. 5.2.D

3 **Enhance debugging and troubleshooting skills. DOK2** 5.3

a Identify, diagnose, and fix errors in code. 5.3.A

b Employ debugging techniques to ensure program accuracy and efficiency. 5.3.B

4 **Investigate and integrate ethical programming practices. DOK3** 5.4

a Explore and discuss ethical considerations in programming. 5.4.A

b Analyze real-world examples of ethical and unethical programming practices and their societal impacts. 5.4.B

**Networking** 6

1 **Define and differentiate types of networks. DOK3** 6.1

a Understand and describe the characteristics of various types of networks, including Local Area Network (LAN), Wide Area Network (WAN), and others. 6.1.A

b Explain real-world applications of different network types. 6.1.B

2 **Analyze and draw common network topologies. DOK3** 6.2

a Identify and illustrate basic network topologies. 6.2.A

b Evaluate the pros and cons of each topology in different scenarios. 6.2.B

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3 **Identify and explain the functions of key network devices. DOK2** 6.3

a Describe the purpose and function of essential network devices such as routers, switches, and hubs. 6.3.A

b Understand the roles of these devices in a network setup. 6.3.B

4 **Understand and implement internet protocol (IP) addressing and domain name system (DNS) roles. DOK3** 6.4

a Explain the concept of IP addresses and how they are used in networks. 6.4.A

b Describe DNS roles and their importance in network communication. 6.4.B

5 **Apply network security measures. DOK3** 6.5

a Set up and configure firewalls and antivirus software. 6.5.A

b Practice safe browsing habits and understand the importance of cybersecurity. 6.5.B

6 **Organize and troubleshoot networks. DOK4** 6.6

a Gain hands-on experience in setting up a network. 6.6.A

b Develop skills in troubleshooting common network issues. 6.6.B

7 **Differentiate between the Internet and the World Wide Web (WWW). DOK2** 6.7

a Explain the differences between the Internet and the World Wide Web. 6.7.A

b Understand data transfer processes within these systems. 6.7.B

**Cybersecurity** 7

1 **Understand and describe the fundamentals of cybersecurity. DOK2** 7.1

a Define cybersecurity and its importance in the digital world. 7.1.A

b Discuss the role of cybersecurity in protecting digital information. 7.1.B

2 **Identify and analyze various cyber threats. DOK3** 7.2

a Describe different types of cyber threats, such as malware, phishing, and ransomware. 7.2.A

b Analyze real-world examples of cyberattacks and their impacts. 7.2.B

3 **Implement safe online practices. DOK3** 7.3

a Develop strategies for safe browsing and secure online behavior. 7.3.A

b Explain the importance of antivirus software and firewalls in protecting devices. 7.3.B

4 **Understand data privacy and protection measures. DOK2** 7.4

a Discuss data privacy principles and the importance of protecting personal information. 7.4.A

) Implement basic data protection techniques. 7.4.B

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**xplore the basics of encryption. DOK2** 7.5

a Define encryption and its role in securing digital communications. 7.5.A

b Explain basic encryption methods and their applications. 7.5.B

**6 Investigate ethical hacking principles. DOK3** 7.6

a Define ethical hacking and its purpose. 7.6.A

b Explore the differences between ethical and unethical hacking practices. 7.6.B

**7 Conduct career exploration in cybersecurity. DOK4** 7.7

a Research various career paths in cybersecurity. 7.7.A

b Analyze the skills and qualifications required for different roles in the cybersecurity field. 7.7.B

c Explore the relevance of cybersecurity across different industries and CTE career pathways in Mississippi. 7.7.C

**Artificial Intelligence (AI)** 8

**1 Understand and describe the fundamentals of artificial intelligence. DOK2** 8.1

a Define AI and explain its importance in modern technology. 8.1.A

b Discuss various types of AI (narrow AI, general AI, superintelligent AI) and their applications. 8.1.B

**2 Explore machine learning and its applications. DOK3** 8.2

a Explain the basic principles of machine learning, including supervised and unsupervised learning. 8.2.A

b Investigate real-world applications of machine learning in fields such as healthcare, finance, and entertainment. 8.2.B

**3 Analyze AI in daily life and ethical considerations. DOK4** 8.3

a Identify and discuss how AI is integrated into everyday life through virtual assistants, recommendation systems, and more. 8.3.A

b Critically examine AI's ethical considerations and societal impacts, including bias, privacy, and job displacement. 8.3.B

**4 Investigate future trends in AI. DOK3** 8.4

a Research emerging trends and advancements in AI technology, such as autonomous vehicles, AI in medicine, and AI in creative arts. 8.4.A

b Analyze the potential future impact of AI on various industries and how it may transform career paths. 8.4.B

**5 Complete an AI project. DOK4** 8.5

a Design and implement a comprehensive AI project that integrates concepts from the unit. 8.5.A

b Present the project, highlighting the AI concepts applied, the challenges faced, and the outcomes achieved. 8.5.B

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## Data Science 9

1 **Understand and describe the basics of data science. DOK2** 9.1

- a Define data science and explain its significance in today's data-driven world. 9.1.A
- b Identify real-world data science applications across healthcare, finance, and marketing industries. 9.1.B

2 **Collect and manage data effectively. DOK3** 9.2

- a Explain different data collection methods, including surveys, web scraping, and sensors. 9.2.A
- b Organize and manage data using tools such as spreadsheets, databases, or cloud-based platforms. 9.2.B

3 **Analyze data types and structures DOK3** 9.3

- a Differentiate between various data types (e.g., categorical, numerical) and structures (e.g., tables, arrays). 9.3.A
- b Explore how data is structured and stored in databases, including relational databases. 9.3.B

4 **Visualize data using advanced tools. DOK4** 9.4

- a Create data visualizations, such as charts, graphs, and dashboards, to represent information clearly and effectively. 9.4.A
- b Utilize software tools like Excel, Google Sheets, Tableau, or Python libraries (Matplotlib, Seaborn) to generate visualizations. 9.4.B

5 **Apply statistical concepts in data analysis. DOK3** 9.5

- a Explain basic statistical concepts (mean, median, mode, standard deviation) and their relevance to data science. 9.5.A
- b Conduct statistical analysis to derive meaningful insights from datasets. 9.5.B

6 **Clean and prepare data for analysis. DOK4** 9.6

- a Demonstrate techniques for cleaning and preparing data, including handling missing values, removing duplicates, and correcting errors. 9.6.A
- b Address common data issues such as outliers and inconsistencies. 9.6.B

7 **Conduct basic data analysis and interpret results. DOK4** 9.7

- a Perform basic data analysis using statistical and computational methods. 9.7.A
- b Interpret and communicate the results of data analysis through written reports, presentations, or visualizations. 9.7.B

8 **Examine ethical considerations in data science. DOK3** 9.8

- a Discuss ethical issues related to data privacy, security, and usage. 9.8.A
- b Reflect on real-world examples of ethical and unethical practices in data science, including data breaches and bias in algorithms. 9.8.B

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## Physical Computing 10

1. **Understand and apply the basics of physical computing. DOK2** 10.1
   - a Introduce the fundamentals of physical computing and its applications. 10.1.A
   - b Identify and explain the functions of various physical computing devices, including microcontrollers and sensors. 10.1.B

2. **Utilize and program physical computing devices. DOK3** 10.2
   - a Explore device usage, including microcontrollers (e.g., Arduino, Micro), sensors, and VEX VR. 10.2.A
   - b Develop algorithms to program physical devices to perform specific tasks, such as monitoring environmental conditions or controlling actuators. 10.2.B

3. **Implement and debug robotics projects. DOK4** 10.3
   - a Program and control robots to perform complex tasks using platforms like VEX Robotics or LEGO Mindstorms. 10.3.A
   - b Diagnose and troubleshoot issues in physical computing and robotics projects, refining code and hardware as needed. 10.3.B

4. **Enhance functions with physical computing devices. DOK4** 10.4
   - a Improve and expand the functionality of physical computing devices through advanced programming and hardware integration. 10.4.A
   - b Apply practical skills to solve real-world problems, such as designing a smart home system or automated greenhouse. 10.4.B

5. **Examine ethical considerations in physical computing. DOK3** 10.5
   - a Discuss the ethical implications of physical computing and robotics, such as privacy concerns and the impact on employment. 10.5.A
   - b Reflect on real-world examples of ethical and unethical practices in the field. 10.5.B

6. **Explore virtual reality (VR) applications. DOK3** 10.6
   - a Understand the basics of virtual reality and its various use cases in fields like education, healthcare, and entertainment. 10.6.A
   - b Engage in online VR applications and explore their potential through interactive experiences. 10.6.B

7. **Investigate career opportunities related to physical computing. DOK4** 10.7
   - a Research and present on careers that involve physical computing, robotics, and VR. 10.7.A
   - b Connect physical computing skills to real-world applications in various industries, such as automation, manufacturing, and game development 10.7.B

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:omprehend and apply ethical principles in computer science. DOK3 11.1

a Understand the importance of ethics in technology and its expansive role within the computer science umbrella. 11.1.A

b Discuss and analyze various ethical theories and principles as they apply to computer science, including deontology, utilitarianism, and virtue ethics. 11.1.B

**2 Conduct in-depth ethical analyses. DOK4** 11.2

a Examine real-world ethical dilemmas in technology through case studies, such as data privacy, AI bias, and cybersecurity breaches. 11.2.A

b Reflect on the ethical implications of emerging technologies and digital practices, considering both short-term and long-term societal impacts. 11.2.B

**3 Develop and implement ethical standards. DOK4** 11.3

a Create an ethical code of conduct for computer science professionals that addresses issues like data protection, user consent, and transparency. 11.3.A

b Propose solutions to ethical challenges encountered in different technology sectors, such as social media, artificial intelligence, and cybersecurity. 11.3.B

**4 Engage in comprehensive research and scenario analysis. DOK4** 11.4

a Conduct research on multiple ethical scenarios in various fields of technology, such as autonomous vehicles, facial recognition, and social media algorithms. 11.4.A

## Advanced Computing Concepts E

**1 Advanced Programming Techniques DOK4** E.1

a Develop complex algorithms and implement them using text-based programming languages. E.1.A

b Explore advanced programming structures such as recursion, data structures, and object-oriented programming. E.1.B

**2 Cybersecurity Challenges DOK4** E.2

a Simulate and defend against advanced cyber threats in a controlled environment. E.2.A

b Develop and implement comprehensive cybersecurity strategies that address real-world scenarios. E.2.B

**3 Data Science and Analytics DOK4** E.3

a Conduct advanced data analysis using statistical software, focusing on predictive analytics and data visualization techniques. E.3.A

b Develop machine learning models to analyze large datasets, applying AI techniques to derive insights and make data-driven decisions. E.3.B

**4 Ethical Computing Practices DOK4** E.4

a Investigate the ethical implications of emerging technologies, such as AI, machine learning, and big data. E.4.A

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b Develop and propose ethical guidelines for technology use in various sectors, focusing on privacy, equity, and transparency. E.4.B

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**5 Advanced Networking and Internet Concepts DOK4** E.5

a Design and implement scalable network solutions using advanced networking protocols and architectures. E.5.A

b Analyze and address network security vulnerabilities using industry-standard tools and practices. E.5.B