SPRING GROVE AREA SCHOOL DISTRICT

PLANNED COURSE OVERVIEW

Course Title: Cyber Defense Principles and Practices	**Length of Course:** 15 cycles
Grade Level(s): 9-12	**Periods Per Cycle:** 6
Units of Credit: .5	**Length of Period:** 43 minutes
Classification: Elective	**Total Instructional Time:** 64.5 hours

Course Description

In this course, students will learn how to keep computer systems safe and secure using operating system features in both Windows and Ubuntu. Topics of study include user policies, computer security, networking, and other key concepts relevant to cyber defense and security. Students will use virtual images of operating systems to perform the required tasks for the course.

Instructional Strategies, Learning Practices, Activities, and Experiences

Bell Ringers	Teacher Demonstrations	Guided Practice
Computer Simulations	Guided Group Practice	Reading
Research	Computer Tests	

Assessments

Quizzes	Tests	Computer Simulations
Common Final		

Materials/Resources

Online Resources	www.uscyberpatriot.org	MSDN (Microsoft Developer Network) Virtual Imaging Software
Ubuntu Imaging Software		

Adopted: 5/16/16
Revised: 5/20/2019

Unit 0: Cyber Ethics	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Fundamentals of ethical behavior in the real-world and online	**3.4.12.E.4** - Synthesize the effects of information and communication systems and subsystems as an integral part of the development of the Information Age. • Define key terms for the field of cybersecurity. • Define key attributes of ethical behavior in the cyber world. • Evaluate cyber security behaviors in terms of ethics. • Apply ethical behavior during this course and throughout life.

Unit 1: Introduction to Cybersecurity	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Introduction to cybersecurity concepts	**3.4.10.B.2** - Demonstrate how humans devise technologies to reduce the negative consequences of other technologies. • Examine the importance of cybersecurity in our ever changing world. • Outline Cyber careers.

Unit 2: Online Safety	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Stay safe on the Internet	**3.4.10.B.2** - Demonstrate how humans devise technologies to reduce the negative consequences of other technologies. • Explain Cyberbullying and provide viable ways to avoid becoming a victim. • Summarize how to protect personally identifiable information. • Develop ways to safely use social media.

Unit 3: Computer Basics and Virtual Machines	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Computer hardware and the software used to play competition virtual machine images	**3.4.10.D.2** - Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it. **2.5.11.A** - Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense, and explain how the problem was solved in grade appropriate contexts. • List vital computer hardware components. • Explain how hardware components are connected (both physically and relationally). • Summarize how computers operate including key hardware components. • Explain how computers are connected in a basic network. • Define virtualization and its uses. • Demonstrate how to start a virtual machine.

Unit 4: Principles of Cybersecurity	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Cybersecurity concepts	**3.4.10.D.2** - Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it. **2.5.11.A** - Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense, and explain how the problem was solved in grade appropriate contexts. • What is the confidentiality, integrity, and availability (CIA) Triad? • Demonstrate how to build strong passwords. • Define Social engineering and recognize when it is being used. • Define what makes a program malware. • List different types of malware. • Make use of Anti-Malware programs.

Unit 5: Microsoft Windows Security	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**

Understand how to find and fix common vulnerabilities on Windows images	**3.4.10.D.2** - Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.
	
	2.5.11.A - Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense, and explain how the problem was solved in grade appropriate contexts.
	
	• Utilize Windows' built in security policies and tools to secure a computer system.
	  ○ Password policies
	  ○ Account lockout policies
	  ○ Firewall settings
	  ○ Action Center
	  ○ Windows Update
	• Utilize Windows' built in account management to secure a computer system.
	  ○ Types of accounts
	  ○ Built-in admin account
	  ○ Guest account
	  ○ Add and remove users

Unit 6: Windows File Protections and Monitoring	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Advanced Windows security topics	**3.4.10.D.2** - Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it. **2.5.11.A** - Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense, and explain how the problem was solved in grade appropriate contexts. • Make use of Windows File Protection to secure files on a computer system. • Explain file encryption and its uses. • Examine strategies for file back up. • Utilize Event Viewer to monitor system changes. • Make use of Windows logs to uncover changes that happened in the past. • Utilize task manager to monitor performance and processes in real time.

Unit 7: Introduction to Linux and Ubuntu	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Introduction to non-Windows systems that may be used during the competition	**3.4.10.D.2** - Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it. **2.5.11.A** - Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense, and explain how the problem was solved in grade appropriate contexts. • Explain What Ubuntu is and how it relates to Linux. • List flavors of Linux. • Compare and contrast Windows and Linux. • Define key terms and fundamentals of Linux. • Discover the Linux file system. • Explain how to add and remove software on Linux. • Utilize command line in Linux to perform tasks. • Understand command line syntax for Linux. • Create user accounts in Linux.

Unit 8: Ubuntu Security	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**

Tips for securing an Ubuntu operating system	**3.4.10.D.2** - Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.
	
	2.5.11.A - Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense, and explain how the problem was solved in grade appropriate contexts.
	
	• Perform basic security tasks using the graphic use interface (GUI) in Linux.
	• Perform basic security tasks using the command line interface in Linux.
	• Make use of the command line to perform advanced security tasks in Linux.
	  ○ Password policies
	  ○ Account lockout policies
	  ○ Firewall settings
	  ○ Action Center
	  ○ Windows Update
	  ○ Types of accounts
	  ○ Built-in admin account
	  ○ Guest account
	  ○ Add and remove users

Unit 9: Networking	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**

Networking basics	**3.4.10.D.2** - Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.
	
	2.5.11.A - Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense, and explain how the problem was solved in grade appropriate contexts.
	
	• Examine how networking connects computers together and how information is transferred between them.
	  ○ Transmission Control Protocol (TCP)
	  ○ Internet Protocol (IP)
	  ○ Domain Name System (DNS)
	  ○ Domain Name Resolution
	  ○ Domain Names/Hostnames
	  ○ Ports
	  ○ Internet Assigned Numbers Authority (IANA) Ports Registry