

## Wallenpaupack Area School District

### Wallenpaupack Area High School

Course title: Network Essentials

Length of Course: Full Semester – 1 credit

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#### District Policies:

##### **Academic Integrity:**

Academic integrity is essential to the success of an educational community. Students are responsible for learning and upholding professional standards of research, writing, assessment, and ethics in their areas of study. Written or other work which students submit must be the product of their own efforts and must be consistent with appropriate standards of professional ethics. Academic dishonesty, which includes cheating, plagiarism, multiple submissions and other forms of dishonest or unethical behavior, is prohibited.

##### **Assessment:**

The goal of grading is to report student progress and achievement to the parents to strengthen the home-school connection. The grade should accurately reflect the student's performance in mastering the PA Standards and the WASD curriculum.

##### **Attendance:**

Regular school attendance is vitally important to academic success. Not only does attendance reinforce and enrich the learning process; it also establishes patterns and attitudes that will carry forward into adult work habits. Regular, consistent attendance is a prerequisite to successful school life. Children should be absent only in cases of illness or emergency.

#### Course Description:

This course is a study of the fundamentals of current networking technology. Students will learn to design, plan, implement, and support computer networks. The course introduces the full range of computer networking from local-area networks to wide-area networks technology. Students may be interested in taking the Comp TIA Network+ certification exam.

#### Pennsylvania State Standards:

##### **Science and Technology Education**

- 3.7.12.A:** Apply advanced tools, materials and techniques to answer complex questions.
- 3.7.12.C:** Evaluate computer operations and concepts as to their effectiveness to solve specific problems.
- 3.7.12.D:** Evaluate the effectiveness of computer software to solve specific problems.
- 3.7.12.E:** Assess the effectiveness of computer communications systems.

##### **Reading, Writing, Speaking, and Listening**

- 1.6.9.B:** Demonstrate awareness of audience using appropriate volume and clarity in formal speaking presentations.
- 1.8.9.B:** Conduct inquiry and research on self-selected or assigned topics, issues, or problems using information from a variety of sources and document sources by using a consistent format for citations.  
Organize information logically as it relates to research topic.  
Evaluate information sources for relevance and credibility.
- 1.9.9.A:** Use media and technology resources for research and problem solving in content learning.
- 1.9.9.B:** Analyze the techniques of media messages to evaluate how they influence society.

##### **Mathematics**

- 2.5.11.B:** Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results.

##### **Career Education and Work**

- 13.1.11.A:** Relate careers to individual interests, abilities, and aptitudes.
- 13.1.11.B:** Analyze career options based on personal interests, abilities, aptitudes, achievements and goals.
- 13.1.11.D:** Evaluate school-based opportunities for career awareness/preparation

#### Wallenpaupack Area School District – Technology Literacy Standards

- Standard 1:** Demonstrate proficiency in the use of computer and applications, as well as an understanding of the concepts underlying hardware, software and connectivity.
- Standard 2:** Demonstrate the responsible use of technology and an understanding of ethics and safety issues in using electronic media at home, in school and in society.
- Standard 3:** Demonstrate the ability to use technology for research, critical thinking, problem solving, decision making, communication, collaboration, creativity and innovation.

Updated September 2013

**Students will:**

- List advantages of networked computing relative to stand alone computing
- Distinguish between client server and peer to peer networks
- List elements common to all client/server networks
- Describe several specific uses for a network
- Identify certifications available to networking professionals

**Students will:**

- Identify organizations that set standards for networking
- Describe the purpose of the OSI model and each of it's layers
- Explain the functions of each layer of the OSI model
- Discuss the structure and purpose of data packets and frames
- Describe the two types of addressing covered by the OSI model

**Students will:**

- Explain basic data transmission concepts
- Describe the physical characteristics of media types
- Compare the benefits and limitations of different network media
- Identify wiring standards and best practices for cabling buildings

**Students will:**

- Identify and explain the functions of the core TCP/IP protocols
- Explain how the TCP/IP protocols correlate to layers of the OSI model
- Discuss addressing schemes for TCP/IP in IPv4 and IPv6
- Describe the purpose and implementation of DNS and DHCP
- Identify the well known ports for key TCP/IP services

**Students will:**

- Describe the basic and hybrid LAN physical topologies, and their uses, advantages and disadvantages
- Describe the backbone structures that form the foundation for most LANs
- Understand the transmission methods underlying Ethernet networks

**Students will:**

- Identify the functions of LAN connectivity hardware
- Install, configure, and differentiate between network devices such as NICs, hubs, bridges, switches, routers, and gateways
- Explain the advanced features of a switch and understand popular switching techniques, including VLAN management
- Explain the purposes and properties of routing
- Describe common routing protocols

**Students will:**

- Identify a variety of uses for WANs
- Explain different WAN topologies, including their advantages and disadvantages
- Compare the characteristics of WAN technologies
- Describe several WAN transmission and connection methods
- Describe multiple methods for remotely connecting to a network

**Students will:**

- Describe characteristics common to all network operating systems
- Compare and evaluate NOSs to select the proper one
- Define the requirements for and features of Windows Server 2008

**Students will:**

- Describe the steps involved in an effective troubleshooting methodology
- Follow a systematic troubleshooting process to identify and resolve networking problems

- Document symptoms, solutions, and results when troubleshooting network problems

**Students will:**

- Understand network management and the importance of documentation, baseline measurements, policies, and regulations to assess and maintain a network's health
- Manage a network's performance
- Identify the reasons for and elements of an asset management system
- Plan and follow regular hardware and software maintenance routines

**Major Activities to Support Course Objectives:**

**Labs** – Each student will take part in weekly lab activities that apply skills, and concepts presented during recitation.

**Presentations:** Research-based project based on teacher-directed topics; networking technologies, careers in networking, etc.

**Integrated Project:** Final Project integrating curriculum into a practical, real life scenario that demonstrates proficiency of course curriculum.

**Student Responsibilities:**

**Attendance expectations:**

Attendance is central to your success in this class. Due to the nature of this class, the coursework is completed during the class period; therefore, any absence will result in the student missing work which must be completed.

**Homework expectations:**

Homework is not assigned in this class. All work will be completed in class. However, if more time is needed to complete assignments, students will be required to complete the work at home or during after-school computer lab.

**Make-Up Work:** Students will be given one day for each day you are *excused* from class to turn in make-up work. All assignments and information can be found online or by asking the instructor. They will also receive a missing assignments form with all of the missing assignments, the due date, and your current grade. If you have any trouble completing the assignments please contact me BEFORE class begins for help.

**Late Work:** Any work that is turned in late will lose five (5) points for each day late. If the work is late more than five (5) days, the student will receive a grade of 0%.

**Assessment:**

**Grading study for quizzes and tests Components:**

- Labs— Students will complete lab activities as a demonstration of proficiency in curriculum.
- Quizzes—Students should expect a quiz of daily materials on any random day throughout the week.
- Exams—Students should expect an every Friday. Exams will consist of objective, true/false, and matching questions as well as problem-based questions.
- Projects—Students will be assigned random projects based on the content learned. These projects will allow students to exhibit proficiency in skills obtained and learned information within the content area.
- Class Participation—Students are to contribute within class as it can yield a positive contribution towards their final grade. Students are encouraged to add ideas and information into every day discussions.

**Quarter Grades:**

Classwork (study guides, exercises, projects, participation, keyboarding) = 50-60%

Tests and Quizzes = 50-40%

**Final Exam:**

Final exam is valued at 14% of the student's final average

**Content Pacing Guide:**

<b>Topic</b>	<b>Major Assignments</b>	<b>Estimated Time</b>
An Introduction to Networking	Lab, Research	4 blocks
Networking Standards & The OSI Model	Lab, Research	5 blocks
Transmission Basics and Networking Media	Lab, Research	5 blocks
Topologies & Ethernet Standards	Lab, Research, Project	6 blocks
Network Hardware	Lab, Research	5 blocks
WANs & Remote Connectivity	Lab, Research, Project	6 blocks
Wireless Networking	Lab, Research, Project	5 blocks
Networking Operating Systems	Lab, Research	7 blocks
InDept TCPIP Networking	Lab, Research	6 blocks
Voice and Video Over IP	Lab, Research, Project	7 blocks
Network Security	Lab, Research, Project	8 blocks
Troubleshooting Network Problems	Lab, Research, Project	6 blocks
Ensuring Integrity & Availability	Lab, Research, Project	5 blocks
Network Management	Lab, Research, Project	On-going
Final Project	Lab, Research, Project	4 blocks
Final Exam Review and Test	Lab, Research	3 blocks