School District of Marshfield Course Syllabus

Course Name: DC Computer Networking I PS/II H
Length of Course: Year
Credit: 1 Credit

Program Goal:

Empower learners to be college and career ready through standards-based experiences in the classroom and career-based learning experiences with business and industry partners. Learners will engage through technology in design, building, problem-solving, repair or service, in a collaborative environment through theory and hands-on experiences.

Course Description:

Develop an understanding of computer networking concepts including network design, hardware wiring systems, and IP addressing. Receive hands-on training in the assembly and configuration of networking components. Emphasis will be placed on the basic operation of routers, routing protocols, and switching. This course follows guidelines established by Cisco Networking Academy and may assist you in obtaining a CCNA (Certified Cisco Networking Associate) certification. First year students register for DC Computer Networking I PS. Second year students register for Computer Networking II H.

Board Approved April 2023

DC Computer Networking I PS

MSTC Course Title: Networking I
Course Number: MSTC 10-150-110
Total Credits: 3

Wisconsin Standards for Technology and Engineering (TE)	
Broad-Based (BB)	
BB1: Students will analyze the core concepts of technology.	
Analyze and use technological systems BB1.a	1.a.5.h: Describe how systems can fail because of design flaws, defective parts, poorly matched parts or they were used beyond their design capabilities. 1.a.6.h: Describe how the outputs of one subsystem are the inputs of another subsystem given a prominent energy, power and transportation system.
Analyze and use tools and materials BB1.b	1.b.5.h: Select appropriate resources and explain how trade-offs between competing values, such as availability, cost, desirability, and waste influenced their decision.
Analyze and use electricity and electronic systems BB1.d	1.d.5.h: Describe the role of thermal, optical, and mechanical transducers in sending electrical control signals to modify how a system performs. 1.d.7.h: Inspect and test components such as switches, connectors, relays, and solid-state devices and conductors and take appropriate action.
Analyze, explain, and use control systems BB1.e	1.e.5.h: Identify the multiple controls that sense information from a number of areas, evaluate the system and act accordingly given a flawed complex system. 1.e.6.h: Select and perform appropriate maintenance in order for the product or system to continue functioning properly, to extend its life or to upgrade its capability given a flawed product or system.
Information and Communication Technologies (ICT)	
ICT1: Students will analyze, select, and use information and communication technologies.	
Analyze how communication happens, the different forms of communication and how it affects society ICT1.a	1.a.13.h: Assess how information and communication technologies include the inputs, processes and outputs associated with sending and receiving information. 1.a.14.h: Predict how information and communication systems allow information to be transferred in the future. 1.a.15.h: Evaluate how information and communication systems can be used to inform, persuade, entertain, control, manage and educate. 1.a.16.h: Predict how communication systems could evolve in the future to facilitate understandings in a common language.
Describe how communication is an ever evolving process ICT1.b	1.b.9.h: Asses how communications can be used to manipulate people.

	1.b.10.h: Predict how communication will change in the future. 1.b.11.h: Contrast one type of designed communication of today with another.
Analyze and use various technologies to design and develop websites ICT1.e	1.e.9.h: Explain various licensing requirements. 1.e.10.h: Compare the differences between local area networks and wide area networks. 1.e.11.h: Identify the need for security measures with networks to protect privacy and data. 1.e.12.h: Install various networking technology equipment (i.e., routers, switches, hubs, etc.). 1.e.13.h: Explain the relationship between hardware and software, taking into account e-mail, the internet, etc. 1.e.14.h: Design a network system (include power needs, bandwidth requirements, hardware, software, etc.). 1.e.15.h: Perform the functions of a network administrator (i.e., maintaining a network system, management, user login management, system user policies, etc.). 1.e.16.h: Predict how networking will change in the future.
Analyze and use various technologies to produce graphic communication products ICT1.g	1.g.5.h: Identify what type of printing produced a specific product. 1.g.7.h: Predict how printing will change in the future.
Analyze and use various technologies in the telecommunication area ICT1.h	1.h.9.h: Create a broadcast program to send over a long distance. 1.h.10.h: Create a presentation which proposes what the future could look like in the telecommunications field. 1.h.11.h: Create a quality digital animation which could be used in various types of communications.
Wisconsin Common Career Technical Standards (WCCTS)	
Creativity, Critical Thinking, Communication and Collaboration (4C)	
4C1: Students will think and work creatively to develop innovative solutions to problems and opportunities.	
Develop original solutions, products and services to meet a given need 4C1.a	1.a.7.h: Develop original ways to solve a given problem. 1.a.8.h: Design a product or service that could fulfill a human need or desire. 1.a.9.h: Apply past experiences to current problems in developing innovative solutions.
Work creatively with others to develop solutions, products and services 4C1.b	1.b.7.h: Incorporate the skills and experiences of others to develop a new solution to a problem. 1.b.8.h: Work as part of a team to design a product or service that could fulfill a human need or desire. 1.b.9.h: Work as part of a team to improve an existing product or process.
4C2: Students will formulate and defend judgments and decisions by employing critical thinking skills.	

Develop effective resolutions for a given problem, decision or opportunity using available information 4C2.a	2.a.11.h: Determine the information needed to address an identified problem. 2.a.12.h: Contrast the benefits and drawbacks of various proposed resolutions to a given situation. 2.a.13.h: Predict how an action could result in unintended consequences, both positive and negative. 2.a.14.h: Analyze the impact of a decision using a systems thinking model. 2.a.15.h: Determine the best resolution for a problem, decision or opportunity based on given criteria. 2.a.16.h: Defend an action taken or a decision implemented.
Develop and implement a resolution for a new situation using personal knowledge and experience 4C2.b	2.b.5.h: Apply past experience to develop a course of action for a new situation. 2.b.6.h: Use existing knowledge to develop a resolution for a new situation, problem or opportunity.
4C3: Students will communicate and collaborate with others to accomplish tasks and develop solutions to problems and opportunities.	
Communicate thoughts and feelings with others using verbal and non-verbal language 4C3.a	3.a.9.h: Develop a mutually acceptable response to a question or problem. 3.a.11.h: Communicate effectively in the presence of a language barrier. 3.a.12.h: Utilize effective listening skills in creating consensus in a group.
Work collaboratively with others 4C3.b	3.b.7.h: Participate in group processes to generate consensus. 3.b.8.h: Lead group processes to generate consensus.
Use interpersonal skills to resolve conflicts with others in an ethical manner 4C3.c	3.c.7.h: Resolve conflicts productively with individuals as they arise. 3.c.8.h: Lead a team or group through a conflict resolution process to reach a productive outcome.
Career Development (CD)	
CD1: Students will consider, analyze and apply an awareness of self, identity and culture to identify skills and talents.	
Identify person strengths, aptitudes and passions CD1.a	1.a.3.h: Evaluate various occupations and career pathways to identify personal, academic and career goals based on personal strengths, aptitudes and passions.
Demonstrate effective decision-making, problem solving and goal setting CD1.b	1.b.5.h: Use a decision-making and problem-solving model.
Interact effectively with others in similar and diverse teams CD1.c	1.c.11.h: Evaluate how the personal strengths and assets of others contribute to a cooperative group atmosphere. 1.c.12.h: Assess how respect and appreciation for individual and cultural differences impacts group processes.
Apply a range of relevant decision-making strategies CD1.d	1.d.5.h: Predict the outcome of various decisions on personal, social and career success.

	1.d.6.h: Evaluate the impact of personal decision-making strategies on specific outcomes.
CD2: Students will identify the connection between educational achievement and work opportunities in order to reach personal and career goals.	
Apply academic experiences to the world of work, inter-relationships and the community CD2.a	2.a.3.h: Evaluate how performance and connections within the learning community enhance future opportunities. 2.a.4.h: Determine those opportunities that best support attainment of a specific career goal.
Assess attitudes and skills that contribute to successful learning in school and across the life span CD2.b	2.b.7.h: Interpret and analyze the impact of current education, training, and work trends on life, learning and career plans. 2.b.8.h: Assess education and training opportunities to acquire new skills necessary for career advancement. 2.b.9.h: Analyze local and regional labor market and job growth information to select a career pathway for potential advancement.
CD3: Students will create and manage a flexible and responsive individualized learning plan to meet their career goals.	
Investigate the world of work in order to gain knowledge of self in order to make informed career decisions and actions CD3.a	3.a.10.h: Analyze how career plans may be affected by personal growth, external events and changes in motivations and aspirations. 3.a.11.h: Apply academic and employment readiness skills in work-based learning situations such as internships, shadowing and/or mentoring experiences. 3.a.12.h: Evaluate changes in local, national and global employment trends, societal needs and economic conditions related to career planning. 3.a.14.h: Implement an individual learning plan to maximize academic ability and achievement.
Examine and evaluate opportunities that could enhance life and career plans and articulate plan to guide decisions and actions CD3.b	3.b.4.h: Implement strategies for responding to transition and change with flexibility and adaptability. 3.b.5.h: Evaluate the relationship between educational achievement and career development.
Employ career management strategies to achieve future career success and satisfaction CD3.c	3.c.5.h: Determine how principles of equal opportunity, equity, respect, inclusiveness, and fairness, affect career planning and management. 3.c.6.h: Discuss how adaptability and flexibility, especially when initiating or responding to change, contributes to career success.
CD4: Students will identify and apply employability skills.	
Identify and demonstrate positive work behaviors and personal qualities needed to be employable CD4.a	4.a.6.h: Evaluate how self-discipline, self-worth, positive attitude, and integrity displayed in a work situation affect employment status. 4.a.7.h: Assess how flexibility and willingness to learn new knowledge and skills affect employment status. 4.a.8.h: Apply communication strategies when adapting to a culturally diverse environment.

	4.a.9.h: Use positive work-qualities typically desired in each of the career cluster's pathways. 4.a.10.h: Manage work roles and responsibilities to balance them with other life roles and responsibilities.
Demonstrate skills related to seeking and applying for employment to find and obtain a desired job CD4.b	4.b.5.h: Use multiple resources to locate job opportunities. 4.b.6.h: Prepare a resume, cover letter, employment application. 4.b.7.h: Employ critical thinking and decision-making skills to exhibit qualifications to a potential employer in an interview.
Identify and exhibit traits for retaining employment CD4.c	4.c.4.h: Model behaviors that demonstrate reliability and dependability. 4.c.5.h: Maintain appropriate dress and behavior for the job to contribute to a safe and effective workplace/jobsite. 4.c.6.h: Complete required employment forms and documentation. 4.c.7.h: Summarize key activities necessary to retain a job in an industry.
Develop positive relationships with others CD4.d	4.d.5.h: Participate in co-curricular and community activities to enhance the school experience. 4.d.6.h: Evaluate the best method to assist co-workers in accomplishing goals and tasks. 4.d.7.h: Examine the skills required to enable students to successfully transition to post-secondary opportunities. 4.d.8.h: Use a systematic approach to academic and career planning for students to achieve their learning, socio-cultural and work goals.

Key Vocabulary:			
encapsulation	decapsulation	Network Layer (3)	packet
Physical Layer (1)	Ethernet	straight-through cable	startup-config file
Application Layer (7)	firewall	switch	Transport Layer (4)
broadcast domain	frame	Presentation Layer (6)	Router
carrier sense multiple access with collision avoidance (CSMA/CD)	fiber	protocol data unit (PDU)	
collision domain	full duplex	running-config file	virtual LAN (VLAN)
command-line interface (CLI)		Secure Shell (SSH)	Data Link Layer (2)
crossover cable	half duplex	segmentation	Session Layer (5)

Topics/Content Outline- Units and Themes:

Networking I

Quarter 1:

- Chapter 1: Explore the Network
- Chapter 2: Configure a Network Operating System
- Chapter 3: Network Protocols and Communications

Quarter 2:

- Chapter 4: Network Access
- Chapter 5: Ethernet

Quarter 3:

- Chapter 6: Network Layer
- Chapter 7: IP Addressing
- Chapter 8: Subnetting IP Networks

Quarter 4:

- Chapter 9: Transport Layer
- Chapter 10: Application Layer
- Chapter 11: Build a Small Network

Networking II

Quarter 1:

- Chapter 1: Routing Concepts
- Chapter 2: Static Routing
- Chapter 3: Dynamic Routing

Quarter 2:

- Chapter 4: Switched Networks
- Chapter 5: Switch Configuration

Quarter 3:

- Chapter 6: VLANs
- Chapter 7: Access Control Lists
- Chapter 8: DHCP

Quarter 4:

- Chapter 9: NAT for IPv4
- Chapter 10: Device Discovery, Management, and Maintenance

Primary Resource(s):
Cisco Networking Academy- nedacad.com