សាកលវិទ្យាល័យភូមិន្ទភ្នំពេញ
មហាវិទ្យាល័យវិទ្យាសាស្ត្រ
ដេប៉ាតឺម៉ង់ ព័ត៌មានវិទ្យា
បរិញ្ញាបត្រឯកទេស វិទ្យាសាស្ត្រកុំព្យូទ័រ
ឆ្នាំសិក្សា ២០១៩-២០២០

គម្រោងមុខវិជ្ជាសិក្សា			
ចំណងជើងមុខវិជ្ជា	Data Communications I&II		
លេខសម្គាល់មុខវិជ្ជា		ចំនួនក្រេឌីដ	៦
មុខវិជ្ជាមូលដ្ឋាន (លេខសម្គាល់មុខវិជ្ជា)		មុខវិជ្ជារួម(លេខសម្គាល់មុខវិជ្ជា)	
ប្រធានមុខវិជ្ជា	គឹម នោ		
អ៊ីម៉ែល	kim.no120282@yahoo.com	លេខទូរស័ព្ទ	017 222 150
គ្រូបង្រៀនមុខវិជ្ជា	១-លោក ប៉ែង គន់ ២-លោក ឡឹង រីដុល ៣-ខៀវ សុភ័ក្ត្រា ៤-លោក គឹម នោ ៥-លោក ហ៊ួន សៀក	កម្រិតសញ្ញាបត្រ: បរិញ្ញាប័ត្រជាន់ខ្ពស់	
ប្រភេទមុខវិជ្ជា	មុខវិជ្ជាគោល ☑ មុខវិជ្ជាចាំបាច់ ☐ មុខវិជ្ជាជ្រើសរើស ☐ ផ្សេងៗ _____		

១.ការពិពណ៌នាមុខវិជ្ជា

មុខវិជ្ជា: Data Communications I&II រៀបចំឡើងដើម្បីផ្តល់ឱ្យនិស្សិតនូវចំណេះដឹងមូលដ្ឋានអំពី បណ្តាញ (Network) និងបច្ចេកវិទ្យា រួមមានដំណើរការនៃការរៀបចំ គ្រប់គ្រង ក៏ដូចជាការផ្ទេររឺចែករំលែកទិន្នន័យនៅលើបណ្តាញដែលមានទ្រង់ទ្រាយល្មម(LAN)។

២. លទ្ធផលសិក្សាដែលបានរំពឹងទុក(ELOs)

ចុងបញ្ចប់នៃវគ្គសិក្សា និស្សិតអាចទទួលបានចំណេះដឹង (Knowledge)មួយចំនួនដូចខាងក្រោម៖

- ✓ និស្សិតយល់នូវបច្ចេកវិទ្យាដែលបានប្រើប្រាស់ក្នុងការរៀបចំបណ្តាញ Network
- ✓ និស្សិតដឹងថាតើ ឧបករណ៍អាចប្រើប្រាស់ធនធានក្នុងបណ្តាញ Network យ៉ាងណា
- ✓ និស្សិតអាចអោយស្គាល់នូវ ដំណើរការរបស់ Router

- ✓ និស្សិតអាចពន្យល់អោយដឹងថាតើ Switch ដំណើរការយ៉ាងណាខ្លះនៅពេលដែលប្រើវាក្នុងបណ្តាញNetwork ក្នុងទំហំតូចរឹមធ្យម
- ✓ និស្សិតអាចបង្ហាញពីការរៀបចំក្នុងដំណាក់កាលដំបូងនៃឧបករណ៍ Network
- ✓ និស្សិតអាចបង្ហាញរៀបចំបណ្តាញបានក្នុងកំរិតបឋម និងប្រាប់ពីការត្រួតពិនិត្យនូវបណ្តាញនោះប្រកបដោយប្រសិទ្ធភាព។

ចុងបញ្ចប់នៃវគ្គសិក្សា និស្សិតអាចប្រើប្រាស់ជំនាញ (Skills) មួយចំនួនដូចខាងក្រោម ៖

- ✓ យល់អំពីការវិវឌ្ឍន៍នៃបច្ចេកវិទ្យា Network សំរាប់នាពេលបច្ចុប្បន្ន និងអនាគត
- ✓ យល់ពីមូលដ្ឋាននៃការតភ្ជាប់ បច្ចេកវិទ្យា(OSI, TCT/IP) និងសន្តិសុខ ក្នុងបណ្តាញ
- ✓ យល់ពីសញ្ញាណនៃដំណើរការនៃការបញ្ជូន Data (Switching និង Routing) ក្នុង LAN
- ✓ អាចប្រើប្រាស់ មធ្យោបាយ Subnetting (Basic subnetting and VLSM)ក្នុងការរៀបចំបណ្តាញ
- ✓ អាចរៀបចំនិងគ្រប់គ្រងនូវហេដ្ឋារចនាសម្ព័ន្ធនៃបណ្តាញក្នុងកំរិតតូចនិងមធ្យម

ចុងបញ្ចប់នៃវគ្គសិក្សា និស្សិតអាចអភិវឌ្ឍអាកប្បកិរិយា (Attitudes) មួយចំនួនដូចខាងក្រោម (យ៉ាងតិច ២)៖

- ✓ ជឿជាក់លើការងារតបណ្តាញក្នុងកំរិតបឋម និងមធ្យម
- ✓ ចូលចិត្តការអាន ដើម្បីទទួលបានចំណេះដឹងពី Technology ថ្មីៗ ក៏ដូចជាចូលចិត្តការអនុវត្តន៍ច្រើន ដើម្បីបង្កើនជំនាញអោយកាន់តែស្ទាត់

៣. គម្រោងមុខវិជ្ជា

គម្រោងមុខវិជ្ជា ឆមាសទី១			
សប្តាហ៍	ចំណងជើងមុខវិជ្ជាឬសកម្មភាព	ចំនួនម៉ោង	សៀវភៅឬ ឯកសារតម្រូវផ្សេងៗ
១	**Chapter I: Explore the Network** **1-Globally Connected** ➢ Networking Today ➢ Providing Resources in a Network **2-LANs, WANs and The Internet** ➢ Network Components o End Devices o Intermediary Network Devices o Network Media o Network Representations o Topology Diagrams ➢ LANs and WANs o Local Area Networks o WAN Area Networks ➢ The Internet, Intranets and Extranets	៣	*1. Cisco CCNAR&S: Introduction to Networks* *2.Data Communications and Networking 5th Edition (2007), by McGraw-Hill Companies, Americas, New York.*

២ និង ៣	o The Internet o Intranets and Extranets ➢ Internet Connections o Internet Access Technologies o Home and Small Office Internet Connections o Business Internet Connections **3-The Network as a Platform** ➢ Converged Networks o Traditional Separate Networks o The Converged Network ➢ Reliable Network o Network Architecture o Fault Tolerance o Scalability o Quality of Services o Security **4-The Changing Network Environment** ➢ Network Trends o New Trends o Bring Your Own Device o Online Collaboration o Video Communication o Cloud Computing ➢ Technology Trends in the Home ➢ Powerline Networking ➢ Wireless Broadband ➢ Network Security o Security Threats o Security Solutions	៣	*1. Cisco CCNAR&S: Introduction to Networks* *2.Data Communications and Networking 5th Edition (2007), by McGraw-Hill Companies, Americas, New York.*
៤ និង ៥	**Chapter II: Configure a Network Operating System** **1-IOS Bootcamp** ➢ Operating System ➢ Cisco IOS Access o Access Methods o Terminal Emulation Programs ➢ Navigate the IOS o Cisco IOS Modes of Operation o Primary Command Modes o Configuration Command Modes o Navigate Between IOS Modes ➢ Command Structure	៣	*1. Cisco CCNAR&S: Introduction to Networks* *2.Data Communications and Networking 5th Edition (2007), by McGraw-Hill Companies, Americas, New York.*

	o Basic IOS Command Structure o IOS Component Syntax o IOS Help Features o Hot Keys and Shortcuts **2-Basic Device Configuration** ➢ Hostnames ➢ Limit Access to Device Configurations o Secure Device Access o Configure Password o Encrypt Passwords o Banner Messages o Syntax Checker- Limiting Access to a Switch ➢ Save Configuration o Save the Running Configuration File o Alter the Running Configuration o Capture Configuration to a Text File ➢ Address Schemes **3-Address Schemes** ➢ Ports and Addresses o IP Addresses o Interfaces and Ports ➢ Configure IP Addressing o Manual IP Address Configuration for End Devices o Automatic IP Address Configuration for End Devices o Switch Virtual Interface Configuration ➢ Verifying Connectivity o Interface Addressing Verification o End-to-End Connectivity Test		
៦ និង ៧	**Chapter III: Network Protocols and Communication** **1-Rules of Communication** ➢ The Rules o Communication Fundamental o Rule Establishment o Message Encoding o Message Formatting and Encapsulation	៣	*1. Cisco CCNAR&S: Introduction to Networks* *2.Data Communications and Networking 5th Edition (2007), by McGraw-Hill Companies, Americas, New York.*

	o Message Size o Message Timing o Message Delivery Options **2-Network Protocols and Standards** ➢ Protocols o Rules that Govern Communications o Network Protocols o Protocol interaction ➢ Protocol Suites o Protocol Suites and Industry Standards o Development of TCP/IP o TCP/IP Protocol Suite o TCP/IP Communication Process ➢ Standards Organizations o Open Standards o Internet Standards o Electronics and Communication Standard Organizations ➢ Reference Models o The Benefits of Using a Layered Model o The OSI Reference Model o The TCP/IP Protocol Model o OSI Model and TCP/IP Model Comparation **3-Data Transfer in the Network** ➢ Date Encapsulation o Message Segmentation o Protocol Data Units o Encapsulation Example o De-encapsulation Example ➢ Data Access o Network Addresses o Data Link Address o Devices on the Same Network o Devices on the Remote Network	٣	*1. Cisco CCNAR&S: Introduction to Networks* *2.Data Communications and Networking 5th Edition (2007), by McGraw-Hill Companies, Americas, New York.*

ផ ៩ និង ១០	**Chapter IV: Network Access** **1-Physical Layer Protocols** ➢ Physical Layer Connection o Type of Connections o Network Interface Cards ➢ Purpose of Physical Layer o The Physical Layer o Physical Layer Media o Physical Layer Standards ➢ Physical Layer Characteristics o Functions o Bandwidth o Throughput o Types of Physical Media **2-Network Media** ➢ Copper Cabling o Characteristic of Copper Media o Copper Media o Unshielded Twisted-Pair (UTP) Cable o Shielded Twisted-Pair (STP) Cable o Coaxial Cable o Copper Media Safety ➢ UTP Cabling o Properties of UTP Cabling o UTP Cabling Standards o UTP Connections o Types of UTP Cable o Testing UTP Cables ➢ Fiber Optic Cabling o Properties of Fiber Optic Cabling o Fiber Media Cable Design o Types of Fiber Media o Fiber-Optic Connectors o Testing Fiber Cables o Fiber versus Copper ➢ Wireless Media o Properties of Wireless Media o Types of Wireless Media o Wireless LAN **3-Data Link Protocols** ➢ Purpose of the Data Link Layer o The Data Link Layer o Data Link Sublayers o Media Access Control o Providing Access to Media o Data Link Layer Standards	៣ ៣	*1. Cisco CCNAR&S: Introduction to Networks* *2.Data Communications and Networking 5th Edition (2007), by McGraw-Hill Companies, Americas, New York.* *1. Cisco CCNAR&S: Introduction to Networks* *2.Data Communications and Networking 5th Edition (2007), by McGraw-Hill Companies, Americas, New York.*

	4-Medai Access Control ➢ Topologies o Controlling Access to the Media o Physical and Logical Topologies ➢ WAN Technology o Common Physical WAN Topologies o Physical Point-to-Point Topology o Logical Point-to-Point Topology ➢ LAN Topologies o Physical LAN Topologies o Haft and Full Duplex o Media Access Control Methods o Contention-based Access – CSMA/CD o Contention-based Access – CSMA/CA ➢ Data Link Frame o The Frame o Frame Fields o Layer 2 Addresses o LAN and WAN Frames		
១១ ដល់ ១២	**Chapter V: Ethernet** **1-Ethernet Protocol** ➢ Ethernet Frame o Ethernet Encapsulation o MAC Sublayer o Ethernet Evolution o Ethernet Frame Fields ➢ Ethernet MAC Address o MAC Address and Hexadecimal o MAC Addresses : Ethernet Identify o Frame Processing o MAC Address Representations o Unicast MAC Address o Broadcast MAC Address o Multicast MAC Address **2-LAN Switches**	៣	*1. Cisco CCNAR&S: Introduction to Networks* *2.Data Communications and Networking 5th Edition (2007), by McGraw-Hill Companies, Americas, New York.*

	➢ The MAC Address Table o Swtich Fundamentals o Learning MAC Addresses o Filtering Frames ➢ Switch Forwarding Methods o Frame Forwarding Methods on Cisco Switches o Cut-Through Switching o Memory Buffering on Switches ➢ Switch Port Setting o Duplex and Speed Settings o Auto-MDIX **3-Address Resolution Protocol** ➢ MAC and IP o Destination on Same Network o Destination on Remote Network ➢ ARP o Introduction to ARP o ARP Functions o ARP Table ➢ ARP Issues o ARP Broadcasts o ARP Spoofing	៣	*1. Cisco CCNAR&S: Introduction to Networks* *2.Data Communications and Networking 5th Edition (2007), by McGraw-Hill Companies, Americas, New York.*
១៣ ១៤ និង ១៥	**Chapter VI: Network Layer** **1-Network Layer Protocols** ➢ Network Layer in Communication o The Network Layer o Network Layer Protocols ➢ Characteristic of the IP Protocol o Encapsulation IP o Characteristics of IP o IP Connectionless o IP-Best Effort Delivery o IP-Media Independent ➢ IPv4 Packet o Ipv4 Packet Header ➢ Ipv6 Packet o Limitations of Ipv4 o Introducing Ipv6 o Encapsulating Ipv6	៣	*1. Cisco CCNAR&S: Introduction to Networks* *2.Data Communications and Networking 5th Edition (2007), by McGraw-Hill Companies, Americas, New York.*

	o Ipv6 Packet Header **2- Routing** ➢ How a Host Routing o Host Forwarding Decision o Default Gateway o Using the Default Gateway o Host Routing Tables ➢ Router Routing Tables o Router Packet Forwarding Decision o Ipv4 Router Routing Table (Video Demonstration) o Directly Connected Routing Table Entries o Remote Network Routing Table Entries o Next Hop Address (Video Demonstration) **3-Router** ➢ Anatomy of Router o A Router is a Computer o Router CPU and OS o Router Memory o Inside a Router o Connect to a Router o LAN and WAN Interfaces ➢ Router Boot-up o Bootset Files o Router Bootup Process (Video Demonstration) o Show Version Output (Demonstration Commands) **4-Configure a Cisco Router** ➢ Configure Initial Setting o Basic Switch Configuration Steps o Basic Router Configuration Steps (Packet Tracer) ➢ Configure Interfaces o Configure Router Interfaces o Verify Interface Configuration ➢ Configure Default Gateway o Default Gateway of Host o Default Gateway of Switch o Packet Tracer – Connect a Router to a LAN o Packet Tracer – Troubleshooting Default Gateway Issues		

គម្រោងមុខវិជ្ជា ឆមាសទី២			
សប្តាហ៍	ចំណងជើងមុខវិជ្ជាឬសកម្មភាព	ចំនួនម៉ោង	សៀវភៅឬ ឯកសារតម្រូវផ្សេងៗ
១ ២ និង ៣	**Chapter VIII: IP Addressing** **1-IPv4 Network Addresses** ➢ Binary and Decimal Conversion o Ipv4 Address o Video Demo (Converting Binary to Decimal) o Positional Notation o Binary to Decimal Conversion o Decimal to Binary Conversion ➢ Ipv4 Address Structure o Network and Host Portions o The Subnet Mask o Local AND o The Prefix Length o Network, Host, and Broadcast Addresses o Video Demo ➢ Ipv4 Unicast, Broadcast, and Multicast o Static Ipv4 Address Assignment to a Host o Dynamic Ipv4 Address Assignment to a Host o Ipv4 Communication o Unicast Transmission o Broadcast Transmission o Packet Tracer- Investigate Unicast, Broadcast and Multicast Traffic ➢ Type of Ipv4 Address o Public and Private Ipv4 Address o Special User Ipv4 Address o Legacy Classful Addressing o Video Demo o Classless Addressing o Assignment of IP Addresses o Lab-Identifying Ipv4 Addresses **2-Ipv6 Network Address** ➢ Ipv4 Issues o The Need of Ipv6 o Ipv4 and Ipv6 Coexistence ➢ Ipv6 Addressing o Ipv6 Address Representation	៣	*1. Cisco CCNAR&S: Introduction to Networks* *2.Data Communications and Networking 5th Edition (2007), by McGraw-Hill Companies, Americas, New York.*

	○ Rule 1 – Omit Leading 0s ○ Rule 2 – Omit All 0 Segments ➢ Types of Ipv6 Addresses ○ Ipv6 Address Types ○ Ipv6 Prefix Length ○ Ipv6 Unicast Addresses ○ Ipv6 Link-Local Unicast Addresses ➢ Ipv6 Unicast Addresses ○ Structure of an Ipv6 Global Unicast Address ○ Static Configuration of a Global Unicast Address ○ Dynamic Configuration – SLAAC ○ Dynamic Configuration – DHCPv6 ○ EUI-64 Process and Randomly Generated ○ Dynamic Link-Local Addresses ○ Static Link-Local Addresses ○ Verify Ipv6 Address Configuration ○ Packet Tracer (Config. Ipv6 Addressing) ➢ Ipv6 Multicast Addresses ○ Assigned Ipv6 Multicast Addresses ○ Solicited-Node Ipv6 Multicast Addresses ○ Lab-Identifying Ipv6 Addresses, Config. Net Devices **3-Connectivity Verification** ➢ ICMP ○ ICMP and ICMPv6 ○ ICMPv6 Router Solicitation an Router Advertisement Messages ➢ Testing and Verification ○ Ping – Testing the Local Stack ○ Ping – Testing Connectivity to the Local LAN ○ Ping – Testing Connectivity to a Remote Host ○ Traceroute –Testing in Path ○ Packet Tracer – Verifying Ipv4 and Ipv6 Addressing		

	○ Packet Tracer- Pinging and Tracing to Test the Path ○ Lab – Testing Network Connectivity with Ping and Traceroute ○ Lab-mapping the Internet ○ Packet Tracer – Troubleshooting Ipv4 and Ipv6 Addressing		
៤ ដល់ ៥	**Chapter VIII: Subnetting IPv4 Networks** **1-Subnetting an IPv4 Network** ➢ Network Segmentation ○ Broadcast Domains ○ Problems with Large Broadcast Domains ○ Reasons for Subnetting ➢ Subnetting and IPv4 Network ○ Octet Boundaries ○ Subnetting on the Octet Boundary ○ Classless Subnetting ○ Video- The Subnet Mask ○ Video- Subnetting with the Magic Number ○ Classless Subnetting Example ○ Creating 2 Subnettings ○ Video-Demo (Creating Two Equal-sized Subnets) ○ Subnetting Formulas ○ Creating 4 Subnets ○ Video Demo (Creating Four Equal-sized Subnets) ➢ Subnetting a /16 and /8 Prefix ○ Creating Subnets with a /16 prefix ○ Creating 100 Subnets with /16 prefix ○ Calculating the Hosts ○ Video Demo (Creating One Hundred Equal-sized Subnets) ○ Creating 1000 Subnets with a /8 Network ○ Video Demo (Subnetting Across Multiple Octets) ➢ Subnetting to Meet Requirements ○ Subnetting Based on Host Requirements	៣	*1. Cisco CCNAR&S: Introduction to Networks* *2.Data Communications and Networking 5th Edition (2007), by McGraw-Hill Companies, Americas, New York.*

	○ Subnetting Based on Network Requirements ○ Network Requirement Example ○ Lab – Calculating IPv4 Subnets ○ Packet Tracer – Subnetting Scenario ➢ Benefit of Variable Length Subnet Masking (VLSM) ○ Traditional Subnetting Wastes Addresses ○ Variable Length Subnet Masks (VLSM) ○ Basic VLSM ○ Video Demo (VLSM Basics) ○ VLSM Practice **2- Addressing Schemes** ➢ Structured Design ○ Network Address Planning ○ Planning to Address the Network ○ Assigning Address to Devices ○ Packet Tracer – Design and Implement a VLSM Address Scheme ○ Lab for VLSM **3- Design Consideration for IPv6** ➢ Subnetting an IPv6 Network ○ The IPv6 Global Unicast Address ○ Subnetting Using the Subnet ID ○ IPv6 Subnet Allocation ○ Packet Tracer-Implement a Subnetting IPv6 Address Scheme		
៦ ៧ និង ៨	**Chapter IX: Transport Layer** **1-Transport Layer Protocols** ➢ Transportation of Data ○ Role of the Transport Layer ○ Transport Layer Responsibilities ○ Conversation Multiplexing ○ Transport Layer Reliability ○ TCP ○ UDP	៣	*1. Cisco CCNAR&S: Introduction to Networks* *2.Data Communications and Networking 5th Edition (2007), by McGraw-Hill Companies, Americas, New York.*

	○ The Right Transport Layer Protocol for the Right Application ➢ TCP and UDP Overview ○ TCP Features ○ TCP Header ○ UDP Features ○ UDP Header ○ Multiple Separate Communications ○ Port Numbers ○ Socket Pairs ○ Port Number Groups ○ The netstat Command **2-Basic Device Configuration** ➢ TCP Communication Process ○ TCP Server Process ○ TCP Connection Establishment ○ TCP Session Termination ○ TCP Three-Way Handshake Analysis ○ Video Demo (TCP 3-Way Handshake) ○ Lab – Using Wireshark to Observe the TCP 3-Way Handshake) ➢ Reliability and Flow Control ○ TCP Reliability – Ordered Delivery ○ Video Demo (TCP Reliability – Sequence Numbers and Ack) ○ Video Demo (Data Loss and Retransmission) ○ TCP Flow Control - Window Size and Ack ○ TCP Flow Control – Congestion Avoidance ➢ UDP Communication ○ UDP Low Overhead versus Reliability ○ UDP Datagram Reassembly ○ UDP Server Process and Requests ○ UDP Client Process ○ Lab – Using Wireshark to Examine a UDP DNS Capture ➢ TCP or UDP ○ Applications that use TCP		

	o Applications that use UDP o Lab-Using Wireshark to Examine TCP and UDP Capture		
៩ ១០ ទី៧ ១១	**Chapter X: Application Layer** **1-Application Layer Protocols** ➢ Application, Presentation, and Session o Application Layer o Presentation and Session Layer o TCP/IP Application Layer Protocols ➢ How Application Protocols Interact with End-User Application o Client-Server Model o Peer-to-Peer Networks o Peer-to-Peer Applications o Common P2P Applications o Lab-Researching Peer-to-Peer File Sharing **2-Well-Known Application Layer Protocols and Services** ➢ Web and Email Protocols o Hypertext Transfer Protocol and Hypertext Markup Language o HTTP and HTTPs o Email Protocols o SMTP Operation o POP Operation o IMAP Operation o Packet Tracer (Web and Email) ➢ IP Addressing Services o Domain Name Service o DNS Message Format o DNS Hierarchy o The nslookup Command o Dynamic Host Configuration Protocol o DHCP Operation o Packet Tracer (DHCP and DNS Servers) o Lab – Observing DNS Resolution ➢ File Sharing Services o File Transfer Protocol o Server Message Block o Packet Tracer – FTP o Lab – Exploring FTP	៣	*1. Cisco CCNAR&S: Introduction to Networks* *2.Data Communications and Networking 5th Edition (2007), by McGraw-Hill Companies, Americas, New York.*

១២ ១៣ ១៤ និង ១៥	**Chapter XI: Build a Small Network** **1-Network Design** ➢ Devices in a Small Network o Small Network Topologies o Devices Selection for a Small Network o IP Addressing for a Small Network o Redundancy in s Small Network o Traffic Management ➢ Small Network Applications and Protocols o Common Application o Common Protocols o Voice and Video Applications ➢ Scale to Larger Networks o Small Network Growth o Protocol Analysis o Employee Network Utilization **2-Network Security** ➢ Security Threats and Vulnerability o Types of Threats o Physical Security o Types of Vulnerability ➢ Network Attacks o Types of Malware o Reconnaissance Attacks o Access Attacks o Denial of Service Attacks o Lab-Researching Network Security Threats ➢ Network Attack Mitigation o Backup, Upgrade, Update and Patch o Authentication, Authorization and Accounting o Firewalls o Endpoint Security ➢ Device Security o Device Security Overview o Passwords o Basic Security Practices o Enable SSH 3-Basic Network Performance ➢ The Ping Command o Interpreting Ping Results	៣	*1. Cisco CCNAR&S: Introduction to Networks* *2.Data Communications and Networking 5th Edition (2007), by McGraw-Hill Companies, Americas, New York.*

	○ Extended Ping ○ Network Baseline ➢ The Traceroute and tracert Command ○ Interpreting Trace Messages ○ Extended Traceroute ○ Packet Tracer – Test Connectivity with Traceroute ○ Lab- Testing Network Latency with Ping and Traceroute ➢ Show Commands ○ Common show Commands Revisited ○ Video Demo – The show version command ○ Packet Tracert – Using show commands ➢ Host and IOS Commands ○ The ipconfig Command ○ The arp Command ○ The show cdp neighbors Command ○ The show ip interface brief Command ○ Lab-Using the CLI to Gather Network Device Information ➢ Debugging ○ The debug Command ○ The terminal monitor Command 4-Network Troubleshooting ➢ Troubleshooting Methodology ○ Basic Troubleshooting Approaches ○ Resolve or Escalate? ○ Verify and Monitor Solution ➢ Troubleshooting Cables and Interfaces ○ Duplex Operation ○ Duplex Mismatch ➢ Troubleshooting Scenario ○ IP Addressing Issues on IOS Devices ○ Ip Addressing Issues on End Devices ○ Default Gateway Issues		

	o Troubleshooting DNS Issues o Lab-Troubleshooting Connectivity Issues o Packet Tracer (Troubleshooting Connectivity Issues)		

៤. សៀវភៅសិក្សា ឬឯកសារប្រើប្រាស់ផ្សេងៗ

សៀវភៅសិក្សាគោល

1. Cisco CCNAR&S Version 6.0 : Introduction to Networks

សៀវភៅនិងឯកសារពាក់ព័ន្ធផ្សេងៗទៀត

1. *Communications and Networking 5th Edition (2007), by McGraw-Hill Companies, Americas, New York.*

៥. វិធីសាស្ត្រៀន និងបង្រៀន

- ឧទ្ទេសនិងប្រើហ្វឹតសរសេរលើក្តារខៀន រួមទាំង NetAcad Learning System, Video បង្ហាញ និង Packet Tracer Simulation Software
- ប្រើ LCD បញ្ចាំង Slide នៅពេលខ្លះ
- អនុវត្តន៍លំហាត់ជាក់ស្តែង: គ្រូកែលំហាត់គំរូ- និស្សិតអនុវត្តន៍លំហាត់ដោយខ្លួនឯង។

៦. តារកិច្ចឧទ្ទេសខុសត្រូវរបស់និស្សិត

និស្សិតត្រូវ ខិតខំរៀនសូត្រ បំពេញរាល់កិច្ចការទាំងអស់ដែលគ្រូដាក់អោយធ្វើ។

៧. វិន័យក្នុងមុខវិជ្ជា(ក្រឹត្យក្រមស្តីអំពីការលួចចម្លងស្នាដៃអ្នកនិពន្ធ និងការលួចចម្លងពេលប្រឡង វត្តមាន..)

និស្សិតដែលលួចចម្លងស្នាដៃអ្នកដទៃរឺលួចចម្លងពេលប្រលងនឹងទទួលបានពិន្ទុធ្លាក់ដោយស្វ័យប្រវត្តិ។

៨. វិធីសាស្ត្រសម្រាប់វាយតម្លៃ

កិច្ចការត្រូវវាយតម្លៃ	ពិន្ទុ (%)	ភាពឆ្លើយតបនៃវិធីសាស្ត្រវាយតម្លៃទៅនឹងលទ្ធផលសិក្សារំពឹងទុកនីមួយៗនៃមុខវិជ្ជា(ELOs)
វត្តមាន	១០%	

កិច្ចការផ្សេងៗ	៣០%	
ប្រលងឆមាស	៦០%	

ចំណាំ៖ ការវាយតម្លៃក្នុងថ្នាក់៤០ %(formative) ការវាយតម្លៃចុងក្រោយ%៦០(ប្រឡង) (summative)

៩. ការពិពណ៌នាកិច្ចការត្រូវទាយតម្លៃ

១០. ការពិពណ៌នាពិន្ទុ

Letter Grade	Grade Point	Score	Explanation
A	4.00	85-100	Excellent
B+	3.50	80-84	Very Good
B	3.00	75-79	Good
C+	2.50	70-74	Fairly Good
C	2.00	65-69	Fair
D+	1.50	60-64	Poor
D	1.00	50-59	Very Poor
F	0.00	<50	Fail