MikroTik

Certified Network Associate (MTCNA)
Certified Routing Engineer (MTCRE)

MikroTik MTCNA

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American International University Bangladesh

Institute of Continuing Education

COURSE OUTLINE

OUTCOME

By the end of this course, the student will be familiar with RouterOS software and RouterBOARD products and be able to connect the client to the Internet. The student will also be able to configure, manage, do basic troubleshooting of a MikroTik router and provide basic services to clients. In addition, the student will be able to plan, implement and debug routed MikroTik RouterOS network configurations.

Course Prerequisites

The student must have a good understanding of TCP/IP and subnetting.

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Course Curriculum

Module 1

Introduction	About MikroTik
	- What is RouterOS
	- What is RouterBOARD
	First time accessing the router
	- WinBox and MAC-WinBox
	- WebFig and Quick Set
	- Default configuration
	RouterOS command line interface (CLI)
	- SSH and Telnet
	- New terminal in WinBox/WebFig
	RouterOS CLI principles
	- Command history and its benefits
	Initial configuration (Internet access)
	- WAN DHCP-client

	- LAN IP address and default gateway
	- Basic Firewall - NAT masquerade
	Upgrading RouterOS
	- Package types
	- Ways of upgrading
	- RouterBOOT firmware upgrade
	Router identity
	Manage RouterOS logins
	Manage RouterOS services
	Managing configuration backups
	Laboratory
Module 2	
DHCP	DHCP server and client
	- DHCP client
	- DHCP server setup
	- Leases management
	- DHCP server network configuration
	Address Resolution Protocol (ARP)
	Laboratory
Module 3	
Bridging	Bridging overview
	- Bridge concepts and settings
	- Creating bridges
	- Adding ports to bridges

	Bridge wireless networks
	- Station bridge
	Laboratory
Module 4	
Routing	Routing overview
	- Routing concepts
	- Route flags
	Static routing
	- Creating routes
	- Setting default route
	- Managing dynamic routes
	- Implementing static routing in a simple network
	Laboratory
Module 5	
Wireless	802.11a/b/g/n/ac Concepts
	- Frequencies (bands, channels) data-rates chains (tx power, rx sensitivity, country regulations)
	Setup a simple wireless link
	- Access Point configuration
	- Station configuration
	Wireless Security and Encryption
	- Access List
	- Connect List
	- Default Authenticate
	- Default Forward

	- WPA-PSK, WPA2-PSK
	- WPS accept, WPS client
	Monitoring Tools
	- Snooper
	- Registration table
	Laboratory
Module 6	
Firewall	Firewall principles
	- Connection tracking and states
	- Structure, chains and actions
	Firewall Filter in action
	- Filter actions
	Basic Address-List
	Source NAT
	- Masquerade and src-nat action
	Destination NAT
	Laboratory
Module 7	
QoS	Simple Queue
	- Target
	- Destinations
	- Max-limit and limit-at
	- Bursting
	One Simple queue for the whole network (PCQ)

	- pcq-rate configuration
	- pcq-limit configuration
	Laboratory
Module 8	
Tunnels	PPP settings
	- PPP profile
	- PPP secret
	- PPP status
	IP pool
	- Creating pool
	- Managing ranges
	- Assigning to a service
	Secure local network
	- PPPoE service-name
	- PPPoE client
	- PPPoE server
	Point-to-point addresses
	Secure remote networks communication
	Laboratory
Module 9	
Mics	RouterOS tools
	- E-mail
	- Netwatch
	- Ping

	- Traceroute
	- Profiler (CPU load)
	Monitoring
	- Interface traffic monitor
	- Torch
	- Graphs
	- SNMP
	- The Dude
	Contacting support@mikrotik.com
	- supout.rif, autosupout.rif and viewer
	- System logs, enabling debug logs
	- Readable configuration (item comments and names)
	- Network diagrams
	Laboratory

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Module 10

Static Routing	More specific routes
	ECMP
	How to force gateway over specific interface
	Gateway reachability check and route distance
	Routing mark and route policy
	Recursive next-hop and scope/target-scope usage
	Laboratory

Module 11	
Point to Point Addressing	Point to Point address configuration
	Laboratory
Module 12	
VPN	What is VPN?
	Different types of VPN
	Site to site connectivity with tunnels
	- IPIP, EoIP, PPTP, SSTP, L2TP, PPPoE
	VLAN and it's usage
	QinQ implementation
	VLAN and managed switch
	VLAN and switch chip configuration on RouterBOARDs
	Laboratory
Module 13	
OSPF	What is OSPF?
	How OSPF protocol works
	- Hello protocol
	- Database distribution and LSA types explained
	OSPF network structure
	- Areas
	- Router types
	OSPF neighbors and neighbor states (DR and BDR election)
	External Route Distribution methods (type1, type2)

	Interface cost and interface types (broadcast, NBMA, etc.)
	SPT calculation algorithm
	OSPF and multicast (problems with NBMA)
	Stub, NSSA and area ranges (route aggregation)
	Virtual links, usage and limitations
	OSPF routing filters and limitations
	Laboratory