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Certified Network Associate (MTCNA) Training Outline

Duration: 3 days (the course is packed and should not be shorter than 3 days / 24 h)

Outcomes: By the end of this training session, students will become familiar with RouterOS software and RouterBOARD products and be able to connect clients to the Internet. They will also be able to configure, manage, and perform basic troubleshooting of a MikroTik router, and provide basic services to clients.

Target audience: Network engineers and technicians wanting to deploy and support networks based on MikroTik RouterOS devices

Course prerequisites: The student must already have a good understanding of TCP/IP, subnetting, and OSI Layers 1, 2, and 3

Suggested reading: Getting Started with RouterOS

Test yourself: Try the example test on mikrotik.com/client/trainingSessions

For trainers: The course is now updated for RouterOS v7. Only teach RouterOS v7 settings, including the new wireless settings (v7.24.4+). The current stable WinBox version is v4, so it should be used for both the materials and the training itself.
Trainers should provide students with a router with dual-band WiFi, for example, a hAP ax S (an ARM-based WiFi router that supports the new WiFi package). hAP ax lite can also be used, but it limits the labs to single-band 2 GHz operation. A dual-band router is suggested.

Title	Objective

Module 1
Introduction
	• About MikroTik
	  • What is RouterOS
	  • What is SwitchOS (SwOS / SwOS Lite)
	  • Hardware Categories
	• First time accessing the router
	  • WinBox and MAC-WinBox
	  • Mobile applications
	  • WebFig and Quick Set
	  • Default configuration and password
	  • MAC-Telnet and RoMON
	• Accessing the RouterOS command-line interface (CLI)
	  • SSH and Telnet
	  • Console cable
	  • New terminal in WinBox/WebFig
	• Default configuration overview (Internet access)
	• Manage RouterOS IP services
	• RouterOS CLI principles
	  • <tab>, double <tab>, “F1”, navigation
	  • Command history and its benefits
	• Upgrading RouterOS
	  • Package types
	  • Ways of upgrading
	  • Changelog
	  • RouterBOARD firmware (RouterBOOT) upgrade
	• Device-mode
	• IPv6 defaults
	• Router identity
	• Manage RouterOS logins
	• Configuration Management
	  • Saving and restoring the backup
	  • Difference between a backup and an export (.rsc) file
	  • Editing an export file
	  • Safe Mode
	• Resetting a RouterOS device
	• Reinstalling a RouterOS device (Netinstall)
	  • Flashfig
	• RouterOS license levels
	• Sources of additional information
	  • manual.mikrotik.com
	  • forum.mikrotik.com
	  • Distributor and consultant support
	• **Module 1 laboratory**

Module 2
Bridging
	• Bridging overview
	  • Bridge concepts and settings
	  • Creating bridges
	  • Adding ports to bridges
	  • Adding an IP address to the bridge
	• Bridge wireless networks
	  • Station bridge
	• **Module 2 laboratory**

Module 3
DHCP
	• DHCP server and client
	  • DHCP client
	  • DHCP server setup
	  • Lease management
	  • DHCP server network configuration
	• IP Pool
	  • Creating a pool
	  • Managing ranges
	• Address Resolution Protocol (ARP)
	  • ARP modes
	  • RouterOS ARP table
	• DNS
	• **Module 3 laboratory**

Module 4
Routing
	• Routing overview
	  • Routing concepts
	  • Routing Single Process
	  • Administrative distance
	  • Longest Prefix Match
	  • Route flags
	• Static routing
	  • Creating routes
	  • Setting default route
	  • Managing dynamic routes
	  • Implementing static routing in a simple network
	  • ECMP routes
	• **Module 4 laboratory**

Module 5
Wireless
	• 802.11a/b/g/n/ac/ax/be concepts
	  • Frequencies (bands, channels), data rates / chains (TX power, RX sensitivity, country regulations)
	• Wireless packages
	• Set up a simple wireless link
	  • Access Point configuration
	  • Station configuration

	• Wireless Security and Encryption
	  • Access List
	  • Client Isolation
	  • WPA-PSK, WPA2-PSK, WPA3-PSK, Management frames
	  • WPS accept, WPS client
	• Monitoring Tools
	  • Scan
	  • Registration table
	• **Module 5 laboratory**

Module 6
Firewall
	• Firewall principles
	  • Connection tracking and states
	  • Structure, chains and actions
	• Firewall Filter in action
	  • Filter actions
	  • Protecting your router (input)
	  • Protecting your LAN devices (forward)
	• Basic Address-List
	• Interface lists
	• Source NAT
	  • Masquerade and src-nat action
	• Destination NAT
	  • dst-nat and redirect actions
	• FastTrack
	• Fast Path
	• Connection tracking
	• Firewall Logging
	• **Module 6 laboratory**

Module 7
QoS
	• Simple Queue
	  • Target
	  • Destinations
	  • Max-limit and limit-at
	  • Burst
	• Queue Types
	• One Simple Queue for the whole network (PCQ)
	  • PCQ rate configuration
	  • PCQ Queue size configuration
	• **Module 7 laboratory**

Module 8
Tunnels
	• PPP Settings
	  • PPP Profile
	  • PPP Secrets
	  • PPP Active Connections

	• PPPoE Client
	  • PPPoE service-name
	  • PPPoE Client profile matching
	  • Use cases
	• IP Cloud
	• Secure communication with remote networks
	  • Quick Set VPN - L2TP
	  • Back to Home VPN principles
	• **Module 8 laboratory**

Module 9
 	
Tools
	• RouterOS tools
	  • E-mail
	  • Netwatch
	  • Ping and MAC ping
	  • Traceroute
	  • Profiler (CPU load)
	  • MAC-server
	  • IP Scan
	• Monitoring
	  • Interface traffic monitor
	  • Resources
	  • Health
	  • Bandwidth test
	  • Speedtest
	  • Torch
	  • Graphs
	  • SNMP read
	  • MIB database
	  • Packet sniffer
	• System Utilities
	  • Logging
	  • History
	  • Clock
	  • NTP
	• Contacting MikroTik support
	  • supout.rif, autosupout.rif and viewer
	  • Readable configuration (item comments and names)
	  • Network diagrams
	• **Module 9 laboratory**
	• **Final words**