

## Course prerequisites – TCP/IP basics

Title	Objective
Module 1 MikroTik RouterOS Introduction	<ul style="list-style-type: none"><li>• MikroTik RouterOS and RouterBOARD;</li><li>• First time accessing the router + <b>LAB</b>;<ul style="list-style-type: none"><li>• Winbox and MAC-Winbox;</li><li>• Null Modem cable;</li><li>• SSH and Telnet;</li></ul></li><li>• Setup Internet connection via router + <b>LAB</b>;<ul style="list-style-type: none"><li>• IP address and default gateway;</li><li>• DHCP-client;</li><li>• NAT masquerade;</li></ul></li><li>• TCP/IP Basics;<ul style="list-style-type: none"><li>• OSI layers and encapsulation;</li><li>• Communication between two network devices;</li><li>• IP addresses;</li><li>• Networks Masks and Subnets;</li></ul></li><li>• Upgrade RouterOS + <b>LAB</b>;<ul style="list-style-type: none"><li>• get packages;</li><li>• upgrade ways;</li><li>• type of packages;</li></ul></li><li>• Manage RouterOS logins + <b>LAB</b>;</li><li>• Manage RouterOS services;</li><li>• Backup and export/import configuration + <b>LAB</b>;<ul style="list-style-type: none"><li>• save and reload backup;</li><li>• edit export file;</li></ul></li><li>• RouterOS license;<ul style="list-style-type: none"><li>• levels;</li><li>• update license + <b>LAB</b>;</li></ul></li><li>• NTP client configuration;</li><li>• Netinstall + <b>LAB</b>;<ul style="list-style-type: none"><li>• reinstall RouterOS;</li><li>• reset RouterOS</li></ul></li></ul>

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<p>Module 2 MikroTik RouterOS Firewall</p>	<ul style="list-style-type: none"> <li>• Firewall principles; <ul style="list-style-type: none"> <li>• structure;</li> <li>• chains and actions + <b>LAB</b>;</li> </ul> </li> <li>• Firewall Filter in action; <ul style="list-style-type: none"> <li>• filter actions;</li> <li>• filter chains;</li> <li>• protecting your router (input) + <b>LAB</b>;</li> <li>• protection your customers (forward) + <b>LAB</b>;</li> </ul> </li> <li>• RouterOS connection tracking; <ul style="list-style-type: none"> <li>• impact on router;</li> <li>• connection state + <b>LAB</b>;</li> </ul> </li> <li>• Basic Address-List + <b>LAB</b>;</li> <li>• Source NAT; <ul style="list-style-type: none"> <li>• actions + <b>LAB</b>;</li> </ul> </li> <li>• Destination NAT; <ul style="list-style-type: none"> <li>• actions;</li> <li>• DNS cache + <b>LAB</b>;</li> </ul> </li> <li>• NAT limitations;</li> </ul>
<p>Module 3 MikroTik RouterOS QoS</p>	<ul style="list-style-type: none"> <li>• Simple Queue + <b>LAB</b>; <ul style="list-style-type: none"> <li>• target-address;</li> <li>• max-limit and limit-at;</li> <li>• dst-address;</li> <li>• bursts;</li> </ul> </li> <li>• Traffic Prioritization + <b>LAB</b>;</li> <li>• Simple Mangle and Tree Queue + <b>LAB</b>; <ul style="list-style-type: none"> <li>• mark-connection and mark-packet;</li> <li>• queue tree;</li> </ul> </li> <li>• PCQ setup + <b>LAB</b>; <ul style="list-style-type: none"> <li>• pcq-rate configuration;</li> <li>• pcq-limit configuration;</li> </ul> </li> <li>• Bandwidth Test + <b>LAB</b>; <ul style="list-style-type: none"> <li>• client;</li> <li>• server;</li> </ul> </li> <li>• Monitoring; <ul style="list-style-type: none"> <li>• interface traffic monitor;</li> <li>• Torch;</li> <li>• graphs + <b>LAB</b>;</li> <li>• SNMP;</li> </ul> </li> </ul>

Title	Objective
<p>Module 4 Mikrotik RouterOS Network Management</p>	<ul style="list-style-type: none"> <li>• ARP + <b>LAB</b>; <ul style="list-style-type: none"> <li>• ARP modes;</li> <li>• RouterOS ARP table;</li> </ul> </li> <li>• DHCP server and client + <b>LAB</b>; <ul style="list-style-type: none"> <li>• DHCP client;</li> <li>• server setup;</li> <li>• leases management;</li> <li>• DHCP-server network configuration;</li> </ul> </li> <li>• HotSpot + <b>LAB</b>; <ul style="list-style-type: none"> <li>• setup;</li> <li>• users;</li> <li>• walled-garden;</li> <li>• ip-binding;</li> <li>• user profiles;</li> <li>• server profiles;</li> </ul> </li> <li>• Proxy + <b>LAB</b>; <ul style="list-style-type: none"> <li>• setup;</li> <li>• transparent proxy;</li> <li>• HTTP firewall;</li> <li>• HTTP logging;</li> </ul> </li> <li>• Store; <ul style="list-style-type: none"> <li>• format additional disks;</li> <li>• move services to store;</li> </ul> </li> <li>• RouterOS tools; <ul style="list-style-type: none"> <li>• E-mail;</li> <li>• Netwatch + <b>LAB</b>;</li> <li>• Ping, Traceroute;</li> <li>• Profile (CPU load);</li> </ul> </li> </ul>

Title	Objective
Module 5 MikroTik RouterOS Wireless	<ul style="list-style-type: none"> <li>• 802.11a/b/g/n Concepts;               <ul style="list-style-type: none"> <li>• Bands;</li> <li>• Frequencies;</li> <li>• Channels;</li> <li>• Country regulation;</li> </ul> </li> <li>• Setup simple wireless link + <b>LAB</b>;               <ul style="list-style-type: none"> <li>• Access Point configuration;</li> <li>• Station configuration;</li> </ul> </li> <li>• MAC-address filtering + <b>LAB</b>;               <ul style="list-style-type: none"> <li>• default-authentication;</li> <li>• access-list;</li> <li>• connect-list;</li> <li>• default-forwarding;</li> </ul> </li> <li>• Wireless Security and Encryption + <b>LAB</b>;               <ul style="list-style-type: none"> <li>• WPA-PSK;</li> <li>• WPA2-PSK;</li> </ul> </li> <li>• 802.11n specific settings + <b>LAB</b>;               <ul style="list-style-type: none"> <li>• data-rates;</li> <li>• HT chains;</li> <li>• HT guard interval;</li> </ul> </li> <li>• MikroTik wireless protocols + <b>LAB</b>;               <ul style="list-style-type: none"> <li>• Nstreme usage and configuration;</li> <li>• Nstreme Dual configuration;</li> <li>• NV2 (TDMA) configuration;</li> </ul> </li> <li>• Monitoring Tools;               <ul style="list-style-type: none"> <li>• Wireless scan;</li> <li>• Snooper;</li> <li>• Registration table;</li> </ul> </li> </ul>
Module 6 MikroTik RouterOS Bridging	<ul style="list-style-type: none"> <li>• Bridging concepts + <b>LAB</b>;               <ul style="list-style-type: none"> <li>• bridge overview;</li> <li>• create bridge;</li> <li>• add ports to bridge;</li> </ul> </li> <li>• Bridge wireless networks + <b>LAB</b>;               <ul style="list-style-type: none"> <li>• WDS modes;</li> <li>• station-pseudobridge;</li> </ul> </li> <li>• Bridge Wireless and remote networks + <b>LAB</b>;               <ul style="list-style-type: none"> <li>• EoIP tunnel;</li> <li>• VPLS tunnel;</li> </ul> </li> </ul>

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Module 7 MikroTik RouterOS Routing	<ul style="list-style-type: none"> <li>• Routing overview;               <ul style="list-style-type: none"> <li>• routing concepts;</li> <li>• route table;</li> <li>• routes abbreviation;</li> <li>• create routes;</li> </ul> </li> <li>• Static routing;               <ul style="list-style-type: none"> <li>• set default gateway + <b>LAB</b>;</li> <li>• manage dynamic routes;</li> <li>• implement static routing on simple network + <b>LAB</b>;</li> </ul> </li> <li>• OSPF + <b>LAB</b>;               <ul style="list-style-type: none"> <li>• enable OSPF;</li> <li>• implement single-area OSPF;</li> </ul> </li> </ul>
Module 8 MikroTik RouterOS Tunnels	<ul style="list-style-type: none"> <li>• Secure local network;               <ul style="list-style-type: none"> <li>• point-to-point addresses;</li> <li>• create PPPoE client on RouterOS/Windows/MacOS + <b>LAB</b>;</li> <li>• PPPoE service-name;</li> <li>• create PPPoE server + <b>LAB</b>;</li> </ul> </li> <li>• PPP settings;               <ul style="list-style-type: none"> <li>• ppp secret + <b>LAB</b>;</li> <li>• ppp profile + <b>LAB</b>;</li> <li>• ppp status;</li> </ul> </li> <li>• IP pool;               <ul style="list-style-type: none"> <li>• create pool;</li> <li>• manage ranges;</li> <li>• assign to service;</li> </ul> </li> <li>• Secure remote networks communication + <b>LAB</b>;               <ul style="list-style-type: none"> <li>• create PPTP(L2TP) client;</li> <li>• create PPTP(L2TP) server;</li> <li>• setup routes between networks;</li> </ul> </li> </ul>