

Advanced Networking and WAN Technologies

1. **Course number and name:** 020RLIES4 Advanced Networking and WAN Technologies
2. **Credits and contact hours:** 4 ECTS credits, 2x1:15 contact hours + 2:30 lab hours
3. **Instructor's or course coordinator's name:** Eva Razzouk
4. **Text book:**
 - a. **Other supplemental materials:**

Course material and online access to the detailed course content including course text, related interactive media and simulation activities.
5. **Specific course information**
 - a. **Catalog description:**

This course presents the third and fourth courses of the Cisco CCNA Routing & Switching curriculum. It describes the architecture, components, and operations of routers and switches in larger and more complex networks and presents the configuration of those equipments for advanced functionalities. It also discusses the WAN technologies and network services required by converged applications in a complex network, making it possible to understand the selection criteria of network devices and WAN technologies necessary to meet specific network requirements.
 - b. **Prerequisites:** 020RCOES2 Network Routing and Switching
 - c. **Required:** Elective for CCE students
6. **Specific goals for the course**
 - a. **Specific outcomes of instruction:**

Completing this course students will be able to perform the following functions:

 - Configure, verify and troubleshoot VLANs spanning multiple switches: VTP, DTP and EtherChannel
 - Configure, verify and troubleshoot STP protocols: Rapid Spanning Tree Protocol (RSTP), Per VLAN Spanning Tree Plus Protocol (PVST+) and Rapid Per VLAN Spanning Tree Plus Protocol (RPVST+)
 - Understand, configure, and troubleshoot first hop redundancy protocols (HSRP)
 - Understand and describe dynamic routing protocols, distance vector routing protocols, and link-state routing protocols
 - Configure, verify and troubleshoot routers in a complex routed IPv4 or IPv6 network using single-area OSPF, multi-area OSPF, and Enhanced Interior Gateway Routing Protocol (EIGRP)
 - Understand and describe different WAN technologies and their benefits
 - Configure, verify and troubleshoot serial connections: HDLC and PPP

- Understand and describe the operations and benefits of virtual private networks (VPNs) and tunneling
- Configure, verify and troubleshoot tunneling operations
- Configure, verify and troubleshoot eBGP in a single-homed remote access network.
- Configure, verify and troubleshoot IPv4 and IPv6 ACLs
- Configure SNMP to monitor network operations in a small to medium-sized business network
- Troubleshoot a network problem using SPAN
- Describe basic QoS concepts: network transmission characteristics, queueing algorithms and QoS mechanisms
- Describe Cloud Computing and Network Programmability in an enterprise network architecture
- Describe the pillars and the values of the Internet of Everything
- Troubleshoot end-to-end connectivity in a small to medium-sized business network, using a systematic approach

b. KPI addressed by the course:

KPI	a2	b2	b3	e1	e2	e3	k2	k3
Covered	x	x	x	x	x	x	x	x
Assessed	x	x	x	x	x	x	x	x
Give Feedback								

7. Topics and approximate lecture hours:

Class Session	Topics
Session 1	LAN Design
Session 2	Scaling VLANs: VTP, DTP, Layer 3 Switching
Session 3	Scaling VLANs: VTP, DTP, Layer 3 Switching
Session 4	Spanning Tree concepts, variant protocols and configuration
Session 5	Spanning Tree concepts, variant protocols and configuration
Session 6	Etherchannel and HSRP concepts and Implementation
Session 7	Dynamic Routing: Distance Vector and Link-State routing protocols
Session 8	EIGRP characteristics and implementation for IPv4 and IPv6
Session 9	EIGRP characteristics and implementation for IPv4 and IPv6
Session 10	EIGRP Tuning and Troubleshooting
Session 11	Single-Area OSPFv2 and OSPFv3 characteristics and

	implementation
Session 12	Multiarea OSPF Operations and Implementation
Session 13	OSPF Tuning and Troubleshooting
Session 14	WAN concepts and technologies
Session 15	Point-to-Point Connections operations configuration and troubleshooting
Session 16	Branch Connections: VPNs, PPPoE, GRE, eBGP
Session 17	Branch Connections: VPNs, PPPoE, GRE, eBGP
Session 18	Access Control Lists: Standard IPv4 ACLs review, Extended IPv4 ACLs and IPv6 ACLs
Session 19	Access Control Lists: Standard IPv4 ACLs review, Extended IPv4 ACLs and IPv6 ACLs
Session 20	Network Security and Monitoring: LAN Security, SNMP and SPAN
Session 21	Quality of Service overview and mechanism + Network Evolution: Hierarchical Network Design, Cloud and Virtualization
Session 22	Network Evolution: Network Programming, Internet of Everything + Network Troubleshooting methodology and scenarios
Lab1	Configuring Rapid PVST+, PortFast, and BPDU Guard
Lab2	Configuring Basic Single-Area OSPFv2
Lab3	Configuring Advanced EIGRP Features