

## Cisco® Implementing and Administering Cisco® Solutions v1.0 (CCNA)

### Overview

This course gives you a broad range of fundamental knowledge for all IT careers. You will learn how to install, operate, configure, and verify a basic IPv4 and IPv6 network. The course covers configuring network components such as switches, routers, and Wireless LAN Controllers; managing network devices; and identifying basic security threats. The course also gives you a foundation in network programmability, automation, and software-defined networking. This course helps you prepare to take the 200-301 Cisco Certified Network Associate (CCNA) exam to earn CCNA certification. This course consists of 5 days of instructor-led training with hands-on lab practice, plus the equivalent of 3 days of self-paced material. This course includes post class lab access- a total of 60 hours of labs over a 90 day period.

### Prerequisite Comments

Before taking this course, you should have:

- Basic computer literacy
- Basic PC operating system navigation skills
- Basic internet usage skills
- Basic IP address knowledge

### Target Audience

This course is designed for anyone seeking CCNA certification. The course also provides foundational knowledge for all support technicians involved in the basic installation, operation, and verification of Cisco networks.

The job roles best suited to the material in this course are:

- Entry-level network engineer
- Network administrator
- Network support technician
- Help desk technician

### Course Objectives

After taking this course, you should be able to:

Identify the components of a computer network and describe their basic

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### Schedule

Class Length: 5 Days

G2R = "Guaranteed to Run" | OLL = "Online LIVE"  
ILT = "Instructor-Led-Training"

15/03/21	G2R	3:00PM - 11:00PM	Dublin, Ireland	OLL	EUR 3795
22/03/21		9:30AM - 5:00PM	Dublin, Ireland	OLL	EUR 3795
05/04/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
19/04/21		9:30AM - 5:00PM	Dublin, Ireland	OLL	EUR 3795
19/04/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
03/05/21	G2R	4:00PM - 12:00AM	Dublin, Ireland	OLL	EUR 3795
24/05/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
14/06/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
21/06/21		9:30AM - 5:00PM	Dublin, Ireland	OLL	EUR 3795
28/06/21	G2R	4:00PM - 12:00AM	Dublin, Ireland	OLL	EUR 3795
12/07/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
19/07/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
26/07/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
02/08/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
09/08/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
16/08/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795

characteristics  
 Understand the model of host-to-host communication  
 Describe the features and functions of the Cisco IOS Software  
 Describe LANs and the role of switches within LANs  
 Describe Ethernet as the network access layer of TCP/IP and describe the operation of switches  
 Install a switch and perform the initial configuration  
 Describe the TCP/IP internet Layer, IPv4, its addressing scheme, and subnetting  
 Describe the TCP/IP Transport layer and Application layer  
 Explore functions of routing  
 Implement basic configuration on a Cisco router  
 Explain host-to-host communications across switches and routers  
 Identify and resolve common switched network issues and common problems associated with IPv4 addressing  
 Describe IPv6 main features, addresses and configure and verify basic IPv6 connectivity  
 Describe the operation, benefits, and limitations of static routing  
 Describe, implement and verify VLANs and trunks  
 Describe the application and configuration of inter-VLAN routing  
 Explain the basics of dynamic routing protocols and describe components and terms of OSPF  
 Explain how STP and RSTP work  
 Configure link aggregation using EtherChannel  
 Describe the purpose of Layer 3 redundancy protocols  
 Describe basic WAN and VPN concepts  
 Describe the operation of ACLs and their applications in the network  
 Configure internet access using DHCP clients and explain and configure NAT on Cisco routers  
 Describe the basic QoS concepts  
 Describe the concepts of wireless networks, which types of wireless networks can be built and how to use WLC  
 Describe network and device architectures and introduce virtualization  
 Introduce the concept of network programmability and SDN and describe the smart network management solutions like Cisco DNA Center, SD-Access and SD-WAN  
 Configure basic IOS system monitoring tools  
 Describe the management of Cisco devices  
 Describe the current security threat landscape  
 Describe threat defense technologies  
 Implement a basic security configuration of the device management plane  
 Implement basic steps to harden network devices

23/08/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
30/08/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
13/09/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
20/09/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
27/09/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
04/10/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
11/10/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
18/10/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
25/10/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
01/11/21	G2R	1:00PM - 9:00PM	Dublin, Ireland	OLL	EUR 3795
08/11/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
15/11/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
29/11/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
06/12/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795
13/12/21	G2R	2:00PM - 10:00PM	Dublin, Ireland	OLL	EUR 3795

## Course Outline

### 1 - Exploring the Functions of Networking

What is a computer network?  
 Components of a network  
 Characteristics of a network  
 Physical vs. Logical Topologies  
 Interpreting a network diagram  
 Impact of user applications on the network

## 2 - Introducing the Host-To-Host Communications Model

Host-to-host communications overview  
ISO OSI reference model  
TCP/IP protocol Suite  
Peer-to-peer communications  
Encapsulation and de-encapsulation  
TCP/IP stack vs OSI reference model

## 3 - Operating Cisco IOS Software

Cisco IOS software features and functions  
Cisco IOS software CLI functions  
Cisco IOS software models  
Discovery 1: Get started with Cisco CLI

## 4 - Introducing LANs

Local area networks  
LAN components  
Need for switches  
Characteristics and features of switches

## 5 - Exploring the TCP/IP Link Layer

Ethernet LAN connection media  
Ethernet frame structure  
LAN communication types  
MAC addresses  
Frame switching  
Discovery 2: Observe how a switch operate  
Duplex communication

## 6 - Starting a Switch

Switch installation  
Connecting to a console port  
Switch LED indicators  
Basic show commands and information  
Discovery 3: Perform basic switch configuration  
Implement the initial switch configuration

## 7 - Introducing the TCP/IP Internet Layer, IPv4 Addressing, and Subnets

- Internet protocol
- Decimal and binary number systems
- Binary-to-decimal conversion
- Decimal-to-binary conversion
- IPv4 address representation
- IPv4 header fields
- IPv4 address classes
- Subnet masks
- Subnets
- Implementing subnetting: Borrowing bits
- Implementing subnetting: Determining the addressing scheme
- Benefits of VLSM and Implementing VLSM
- Private vs. Public IPv4 addresses
- Reserved IPv4 addresses
- Verifying IPv4 address of a host

## 8 - Explaining the TCP/IP Transport Layer and Application Layer

- TCP/IP transport layer functions
- Reliable vs. Best-effort transport
- TCP characteristics
- UDP characteristics
- TCP/IP application layer
- Introducing HTTP
- Domain name system
- Explaining DHCP for IPv4
- Discovery 4: Inspect TCP/IP applications

## 9 - Exploring the Functions of Routing

- Role of a router
- Router components
- Router functions
- Routing table
- Path determination

## 10 - Configuring a Cisco Router

- Initial router setup
- Configuring router interfaces
- Configuring IPv4 addresses on router interfaces
- Checking interface configuration and status
- Discovery 5: Configure an interface on a Cisco router
- Exploring connected devices
- Using Cisco Discovery Protocol
- Configure and verify LLDP
- Discovery 6: Configure and verify layer 2 discovery protocols
- Implement an initial router configuration

## 11 - Exploring the Packet Delivery Process

Layer 2 addressing  
Layer 3 addressing  
Default gateways  
Address resolution protocol  
Discover 7: Configure default gateway  
Host-to-host packet delivery  
Discovery 8: Explore packet forwarding

## 12 - Troubleshooting a Simple Network

Troubleshooting methods  
Troubleshooting tools  
Troubleshooting common switch media issues  
Troubleshooting common switch port issues  
Discovery 9: Troubleshoot switch media and port issues  
Discovery 10: Troubleshoot port duplex issues  
Troubleshooting common problems associated with IPv4 addressing

## 13 - Introducing Basic IPv6

IPv4 address exhaustion workarounds  
IPv6 features  
IPv6 addresses and address types  
Comparison of IPv4 and IPv6 header  
Internet control message protocol version 6  
Neighbor discovery  
IPv6 address allocation  
Discovery 11: Configure basic IPv6 connectivity  
Verification of end-to-end IPv6 connectivity

## 14 - Configuring Static Routing

Routing Operation  
Static and dynamic routing comparison  
When to use static routing  
IPv4 static route configuration  
Default routes  
Verifying static and default route configuration  
Discovery 12: Configure and verify IPv4 static routes  
Configuring IPv6 static routes  
Discovery 13: Configure IPv6 static routes  
Implement IPv4 static routing  
Implement IPv6 static routing

## 15 - Implementing VLANs and Trunks

VLAN Introduction  
Creating a VLAN  
Assigning a port to a VLAN  
Trunking with 802.1Q  
Configuring an 802.1Q trunk  
Discovery 14: Configure VLAN and trunk  
VLAN design considerations  
Troubleshoot VLANs and trunk

## 16 - Routing Between VLANs

Purpose of Inter-VLAN routing  
Options for the Inter-VLAN routing  
Discovery 15: Configure a router on a stick  
Implement multiple VLANs and basic routing between the VLANs

## 17 - Introducing OSPF

Dynamic routing protocols  
Path selection  
Link-State routing protocol overview  
Link-State routing protocol data structures  
Introducing OSPF  
Establishing OSPF neighbor adjacencies  
OSPF neighbor states  
SPF algorithm  
Building a Link-State database  
Discovery 16: Configure and verify single-area OSPF  
Routing for IPv6

## 18 - Building Redundant Switched Topologies (Self-study)

Physical redundancy in a LAN  
Issues in redundant topologies  
Spanning tree operation  
Types of spanning tree protocols  
PortFast and BPDU guard  
Rapid spanning tree protocol

## 19 - Improving Redundant Switched Topologies with EtherChannel

EtherChannel overview  
EtherChannel configuration options  
Configuring and verifying EtherChannel  
Discovery 17: Configure and verify EtherChannel  
Improve redundant switched topologies with EtherChannel

## 20 - Exploring Layer 3 Redundancy (Self-study)

Need for default gateway redundancy  
Understanding FHRP  
Understanding HSRP

## 21 - Introducing WAN Technologies (Self-study)

Introduction to WAN technologies  
WAN devices and demarcation point  
WAN topology options  
WAN connectivity options  
Virtual private networks  
Enterprise-managed VPNs  
Provider-managed VPNs

## 22 - Explaining Basics of ACL

ACL overview  
ACL operation  
ACL wildcard masking  
Wildcard mask abbreviations  
Types of basic ACLs  
Configuring standard IPv4 ACLs  
Configuring extended IPv4 ACLs  
Verifying and modifying IPv4 ACLs  
Applying IPv4 ACLs to filter network traffic  
Discovery 18: Configure and verify IPv4 ACLs  
Implement numbered and named IPv4 ACLs

## 23 - Enabling Internet Connectivity

Discovery 19: Configure a provider-assigned IPv4 address  
Introducing network address translation  
NAT terminology and translation mechanisms  
Benefits and drawbacks of NAT  
Static NAT and port forwarding  
Dynamic NAT  
Port address translation  
Configuring and verifying inside IPv4 NAT  
Discovery 20: Configure static NAT  
Discovery 21: Configure dynamic NAT and PAT  
Implement PAT

## 24 - Introducing QoS (Self-study)

Converged networks  
Quality of service defined  
QoS policy  
QoS mechanisms  
QoS models  
Deploying end-to-end QoS

## 25 - Explaining Wireless Fundamentals (Self-study)

Wireless technologies  
WLAN architectures  
WiFi channels  
AP and WLC management  
Discovery 22: Log into the WLC  
Discovery 23: Monitor the WLC  
Discovery 24: Configure a dynamic (VLAN) interface  
Discovery 25: Configure a DHCP scope  
Discovery 26: Configure a WLAN  
Discovery 27: Define a RADIUS server  
Discovery 28: Explore management options

## 26 - Introducing Architectures and Virtualization (Self-study)

Introduction to network design  
Enterprise three-tier hierarchical network design  
Spine-leaf network design  
Cisco enterprise architecture model  
Cloud computing overview  
Network device architecture  
Virtualization fundamentals

## 27 - Explaining the Evolution of Intelligent Networks

Overview of network programmability in enterprise networks  
Software-defined networking  
Common programmability protocols and methods  
Configuration management tools  
Introducing Cisco DNA center  
Discovery 29: Explore the Cisco DNA center  
Introducing Cisco SD-Access  
Introducing Cisco SD-WAN



## 28 - Introducing System Monitoring

- Introducing Syslog
- Syslog message format
- SNMP overview
- Enabling network time protocol
- Discovery 30: Configure and verify NTP
- Configure system message logging

## 29 - Managing Cisco Devices

- Cisco IOS intergrated file system adn devices
- Stages of the router power-on boot sequence
- Loading and managing system images files
- Loading Cisco IOS configuration files
- Validating Cisco IOS images using MD5
- Managing Cisco IOS images and device configuration files
- Discovery 31: Create the Cisco IOS impage backup
- Discovery 32: Upgrade Cisco IOS image

## 30 - Examining the Security Threat Landscape (Self-study)

- Security threat landscape overview
- Malware
- Hacking tools
- Denial of service and distributed denial of service
- Spoofing
- Reflection and amplification attacks
- Social engineering
- Evolution of Phishing
- Password attacks
- Reconnaissance attacks
- Buffer overflow attacks
- Man-in-the-middle attacks
- Vectors of data loss and exfiltration
- Other considerations

## 31 - Implementing Threat Defense Technologies (Self-study)

- Information security overview
- Firewalls
- Intrusion prevention systems
- Protection against data loss and phishing attacks
- Defending against DoS and DDoS attacks
- Introduction to cryptographic technologies
- IPsec security services
- Seccure sockets Layer and transport layer securiy
- Wireless security protocols
- Discover 33: Configure WLAN using WPA2 PSK using the GUI

## 32 - Securing Administrative Access

- Network device security overview
- Securing access to privileged EXEC mode
- Securing console access
- Securing remote access
- Discover 34: Secure console and remote access
- Configuring the login banner
- Limiting remote access with ACLs
- Discovery 35: Enable and limit remote access connectivity
- External authentication options
- Secure device administrative access

## 33 - Implementing Device Hardening

- Securing unused ports
- Infrastructure ACL
- Disabling unused services
- Port security
- Discovery 36: Configure and verify port security
- Mitigating VLAN attacks
- DHCP snooping
- Dynamic ARP inspection
- Mitigation STP attacks
- Implement device hardening

The self-study material can be done at your own pace after the instructor-led portion of the course.