

<b>Pre-Requisite Modules code(s)</b>	<b>Co-Requisite Modules code(s)</b>	<b>ECTS Credits</b>	<b>Module Code</b>	<b>Module Title</b>
NETW2101	None	10	NETW2201	WAN Technologies

## 6.19 NETW2201 WAN Technologies (CCNA4)

**Module Author:** Dermot Clarke / Joseph Kellegher

### **Module Description:**

The module introduces WAN technologies including PPP, Frame Relay, and broadband links. It also covers WAN security concepts including types of threats, how to analyze network vulnerabilities, general methods for mitigating common security threats and types of security appliances and applications. Other topics such as NAT, DHCP and IPv6 are also covered

### **Module Aim:**

The primary focus of this module is on accessing wide area networks (WAN). The goal is to develop an understanding of various WAN technologies to connect small- to medium-sized business networks.

### **Learning Outcomes:**

On completion of this module, the learner will be able to:

- Describe different methods for connecting to a WAN
- Implement, verify and troubleshoot WAN connection such as PPP and Frame Relay on routers.
- Describe the importance, benefits, role, impact, and components of VPN technology.
- Describe the impact of Voice Over IP and Video Over IP applications on a network.
- Explain the operation and benefits, configure, verify, and troubleshoot DHCP and DNS operations.
- Describe current network security threats and explain how to implement security policy to mitigate common threats.
- Describe the functions of common security appliances and applications
- Describe the purpose of, configure, monitor and troubleshoot different types of ACLs.
- Explain the basic operation of, configure and troubleshoot Network Address Translation (NAT)

### **Learning and Teaching Methods:**

This module will be taught through classroom lectures.

The lecture material will be reinforced and expanded on by practical exercises in the laboratory

### **Module Content:**

#### **Lecture Material**

- Introduction to WANs: Technologies available to implement them, and the terminology used to discuss them.
- PPP: Understanding how PPP works and aspects such as securing PPP using various protocols.

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- Frame Relay: Introduction to Frame Relay protocol and how to implement it.
- Network Security: Threats and mitigation techniques. Configure router security.
- ACLs: Concepts and use of them to secure networks. Standard, extended and complex
- Broadband Technologies: Technologies such as DSL and wireless. VPNs and securing broadband connections.
- IP Addressing Services: Configuring DHCP and NAT. Overview of IPv6.
- Network Troubleshooting: Establishing a network baseline and to develop documentation to help in troubleshooting.

### **Laboratory Content:**

The laboratory programme will support the lecture programme and will include the following topics:

- Configuring, verifying, and troubleshoot a PPP & Frame Relay WAN links.
- Configuring, verifying and troubleshooting basic network security using the CLI, auto-secure feature, Cisco SDM.
- Configure verifying and troubleshooting basic and extended ACLs.
- Configure verifying and troubleshooting NAT and DHCP IP services
- Troubleshooting enterprise networks.

### **Module Assessment:**

The assessment is 100% continuous and comprises three components.

Component 1 is a multiple choice 1 hour exam sat at the end of the semester. This accounts for 50% of the overall assessment.

Component 2 is a series of multiple choice exams sat one per week, typically. These account for 20% of the overall assessment.

Component 3 is for laboratory work. This accounts for 30% of the overall assessment. The laboratory assessment will be as defined in the general laboratory assessment regulations of the School of Electronic and Communications Engineering.

The overall pass mark is 40%. To achieve a pass result students must achieve at least 35% of the total available marks in Component 1 and Component 3.

### **Essential Reading:**

Reid (2006) WAN Technologies - CCNA 4 Companion Guide, Cisco Press

### **Other Resources:**

<http://cisco.netacad.net>: *Module support material is available on-line for registered students.*

### **Further Details:**

This module is delivered over one semester, during which there are 3 hours of lectures per week and one 2-hour laboratory session per week.

Over the module duration of 13 weeks, students are expected to spend an average of an additional 5 hours per week in private study as well as an additional 1 hour for an open book online multiple choice tests done outside class time..

**DATE of Academic Council approval .....**