

_.LanNet

LanNet v1
Ethernet Local Area Networks

LanNet

- is a suite of interactive, multimedia e-learning courses designed to run under 95, 98, NT4, 2000 Professional, XP or Vista
- provides training in the technical aspects of Ethernet Local Area Networks.
- consists of two separate but integrated courses:

A: Ethernet fundamentals and structured cabling
B: Local Area Networks

Each LanNet course:

- provides several hours of in-depth, authoritative technical training
 - employs interactive simulations, hypertext links and question sessions to fully involve the trainee in the learning experience.
 - provides personalised training with each trainee able to make his/her own notes and place bookmarks. A record of progress and level of achievement is recorded for each trainee.
 - provides a structured assessed course and can also be used to browse for revision or reference.
 - can be studied in isolation or as an integrated suite; each chapter of a course includes revision links to relevant subjects covered in the other LanNet courses.
-

Target audience:

- Those studying for a career in data communications and who require a detailed knowledge of Ethernet Local Area Networks.
 - Technical staff involved in the installation or maintenance of Local Area Networks.
-

Courses for further study:

The following courses from the learntelecoms TransNet suite of e-learning courses are suggested for study once the LanNet courses have been completed:

- IP networks
- Advanced IP networks

_.LanNet

LanNet v1

Course A: Ethernet fundamentals and structured cabling

Course aim:

This course provides an introduction to the fundamental concepts that underpin the operation of Ethernet Local Area Networks and describes the benefits and components of a structured cabling system.

Pre-requisites:

Secondary (high) school education in Physics; In the UK appropriate pre-requisite qualifications are General Certificate of Secondary Education (GCSE) in Physics or BTEC National Vocational Qualification (NVQ) at level 2 in Electronics.

Principles of digital communications: Introduction to the terminology and underlying principles of digital communications; definition of the concepts of binary encoding, bit rate, bandwidth and bit error rate; role of a Local Area Network (LAN).

Introduction to Ethernet: Basic functions and components of a Local Area Network (LAN); the importance of standards for communications; introduction to the bodies responsible for formulating standards; history of the evolution of the Ethernet standards; role of the IEEE working groups in formulating and revising Ethernet standards.

Introduction to data protocols: Introduction to the concept of a protocol as applied to data communications; role of the different types of protocol in sending a message from one computer to another; introduction to the OSI Reference Model (OSIRM); concepts of frames and packets; introduction to the protocols used in Ethernet LANs, including LLC and MAC.

The Ethernet protocols: Format of the Ethernet 802.3 frame and the role of the individual fields; role of the LLC protocol; role and operation of CSMA/CD in allowing devices to share the transmission medium; description of alternative Ethernet frame formats including SNAP. Ethernet LANs: Description of the physical media, basic components, topology and features of the various types of Ethernet LAN including 10BASE-5, 10BASE-2, 10BASE-T and 100BASE-T.

Structured cabling: The concept of structured cabling and its advantages and disadvantages; description of the structure and components of a structured cabling system; overview of the various standards applicable to structured cabling; description of the cabling categories and classes.

Cable testing: The importance of testing; choosing appropriate test equipment; definition of links and channels; description of appropriate test configurations; overview of standards relevant to testing; significance of the various test parameters; description of the common causes of test failure.

_.LanNet

LanNet v1
Course B: Local Area Networks (LANs)

Course aim:

This course describes the structure and components of Local Area Networks, discusses security and management issues and introduces the concept and application of Virtual Private Networks.

Pre-requisites:

Understanding of the basic principles of Ethernet LANs including CSMA/CD and the role of repeaters and hubs in a 10Base-T network as well as knowledge of the role of the Media Access Control (MAC) protocol. It is recommended that LanNet course A – Ethernet fundamentals – is studied before attempting this course.

Bridging: Advantages of using a bridge to increase the coverage of a LAN; role and operation of the “self-learning” facility of a bridge; problems associated with network loops and methods of prevention; use of a translating bridge to inter-connect LANs of different types; use of remote bridging to connect LANs through a Wide Area Network.

Ethernet switching: Advantages of switching, comparison of store and forward, and cutthrough switching; role and operation of the Spanning Tree Protocol; features and comparison of port-based and segment-based switching; full duplex port operation; buffering and flow control issues for switches with both 10 Mbit/s and 100Mbit/s ports.

Routers: Role and format of IP packets; concept of network addressing; IP addressing structure; basic facilities of a router; advantages of routing compared to switching.

Addressing: Relationship between IP and MAC addresses, role and operation of Address Resolution Protocol, ARP; significance of TCP/UDP port numbers, comparison of static and dynamic (DHCP) IP addressing; role and operation of Network Address Translation (NAT).

Network security: Role of security in Local Area Networks (LANs); role and features of static access lists; advantages and operation of reflexive access lists; operation and benefits of stateful packet inspection; role and facilities of firewalls and proxy servers.

VPNs and network management: The advantages of a Virtual Private Network (VPN), role of VPN clients, VPN servers and the IPsec protocol suite, and issues relating to routers and firewalls in a VPN; role and facilities of the Simple Network Management Protocol, SNMP; role and facilities of the control protocol, ICMP and use of the Ping and Trace commands.