

Digi Comms II

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Aims

- This course aims to provide a detailed understanding of how communications systems operate, through examples, including the phone network and Internet, and presents ways to build such systems.
- It also covers a selection of topics which relate to recent trends in digital communications systems.

Contents 1

- Introduction; course overview.
- The Telephone Net.
 - ◆ It has been around 100 years, and there are important lessons in how it survived and evolved
- The Internet.
 - ◆ It is about 25 years old, and looking decidedly shaky. A quick review of where it is at.
- Asynchronous Transfer Mode networks.
 - ◆ A bold attempt to mix Telephone and Internet.
- Modular Functionality for Communications
 - ◆ Some Systems Design Paradigms, often orthogonal to Layers

Contents 2 (Dave Eysers)

- Naming and Addressing
 - ◆ Reviewing Who is where?
- Common protocols in use today.
 - ◆ To see if we can spot design patterns? Mapping onto common implementation approaches.
- Routing.
 - ◆ How many ways can we work out how to get from A to B?
- Error Control.
 - ◆ What do we do when things go wrong?
 - ◆ Retransmit, or pre-transmit?
- Flow Control.
 - ◆ Stemming the flood, at source, sink, or in between?

Contents 3

- Shared Media Networks
 - ◆ Ethernet and Radio networks - some special problems for media access and so forth.
- Switched Networks
 - ◆ What does a switch do and how?
- Integrated Service Packet Networks for IP
 - ◆ APIs to Quality of Service
 - ◆ Scheduling and Queue Management Algorithms for packet forwarding
 - ◆ What about routing with QoS
- The Big Picture for managing traffic
 - ◆ Economics, Policy and a little MPLS

Contents 4

- Surprise guests....
- Lectures are a partial order and may be topologically resorted depending on lecturer availability.

Objectives

- At the end of the course students should be able to explain the concepts such as Addressing, Buffer Management, Congestion Control, Differential Services, Estimation, Feedback, Gateways, Hierarchy, IP, Jitter, k-ary resilience, Layering, Multiplexing, Networking, OSI, Priority, Queuing, Routing, Switching, Transmission Control, User Plane, Virtualisation, Wireless, eXtensibility, or, ok, Xen:), Yield management, and Zeroconf.

Reading

- Keshav, S. (1997). *An engineering approach to computer networking*. Addison-Wesley (1st ed.). ISBN 0201634422
- Davie, B.S., Peterson, L.L. & Clark, D. (1999). *Computer networks: a systems approach*. Morgan Kaufmann (2nd ed.). ISBN 1558605142
- Stevens, W.R. (1994). *TCP/IP illustrated, volume 1: the protocols*. Addison-Wesley (1st ed.). ISBN 0201633469