The midterm will cover the following topics:

Protocols: definition and types (should be able to list a few)

Packet switches: types, functionalities

How to access/connect Internet

Should be able to explain how packets move from one host to another in the Internet

Describe from the equipment point of view and TCP/IP layer point of view

Routers and switches

Roles, functions

FDM/TDM/Phase Shift

HFC meaning, purpose

How internet access is done in cable -based

Physical media:

Wireless radio / Radio link types

Wireless LAN / Wide-area cellular

Transmission delay

What it is and how to calculate

Trans Media

Guided/ unguided

Coax/ fiber optic cable

Wireless/Radio

Packet switching

Packet transmission delay

Queueing: when does it happen?

Store-and-forward

Circuit switching

Definition/differences between packet switching and circuit switching

Packet delay: 4 sources and explain what each delay does

What does tracert do and how it works?

Security

Sniffing/ DoS/ IP spoofing

Lines of defense: definitions

TCP/IP layer explain what each layer does

End-to-end view

Equipment used to forward packets

Overview

Main ideas: sources, transmission, and sharing among multiple sources

Understand the concepts

Source and destination

Mechanism

Channel errors, encryption, multiple streams: what it is, purposes

Signal characteristics

Channel encoder/decoder

Transmission errors: parity, checksums, and cyclic redundancy codes

Transmission media, modes, channel bandwidth, noise and interference,

channel capacity

classification by the Forms of energy

Categories: what are those, which belongs where

Latest twisted pair cable

Properties of each medium

Electromagnetic spectrum

Satellite

Types and properties

Delay calculations

Nyquist

D=2B log base 2 K (signal level)

Shannon

C = B log base 2 (1 + S/N)

Linear dB = 10^(dB/10), e.g. s/n = 30, 10^(30/10) = 1000

Error detection

Hamming distance, minimum hamming distance and error checking capability and required Hamming distance for error correction

Parity (RAC), checksum, and CRC calculations

Datawords and codewords

How checksum works

How to do CRC computation

Transmission modes

Describe the difference between Serial and parallel

Categories by timing of serial transmission: asynchronous, synchronous, and Isochronous

RS-232C

Line coding

What it is and how it work. Pros and cons

Manchester encoding

How it works

Sampling for digitization

Sampling rate = 2 \* max frequency

e.g. voice frequency max -> 4000Hz, so sampling rate is 2\*4000 = 8000/sec

When using voice circuit, we achieve max of 64kbps (8bits \* 8000)

Cable modem

How it works. Involved equipment. When to use framing.

DCE/DTE

What are those? Related standards?

Modulation schemes

How many inputs?

Techniques

Shift keying – limiting factors

QAM – ASK and PSK