

SIMON FRASER UNIVERSITY
School of Engineering Science
ENSC 428-4 Data Communications

0. ABOUT THIS COURSE

Scope

- physical layer issues
- how to extract discrete information (bits) when received signals may be distorted and have added noise and interference
- detection, synchronization, error control coding

Objectives

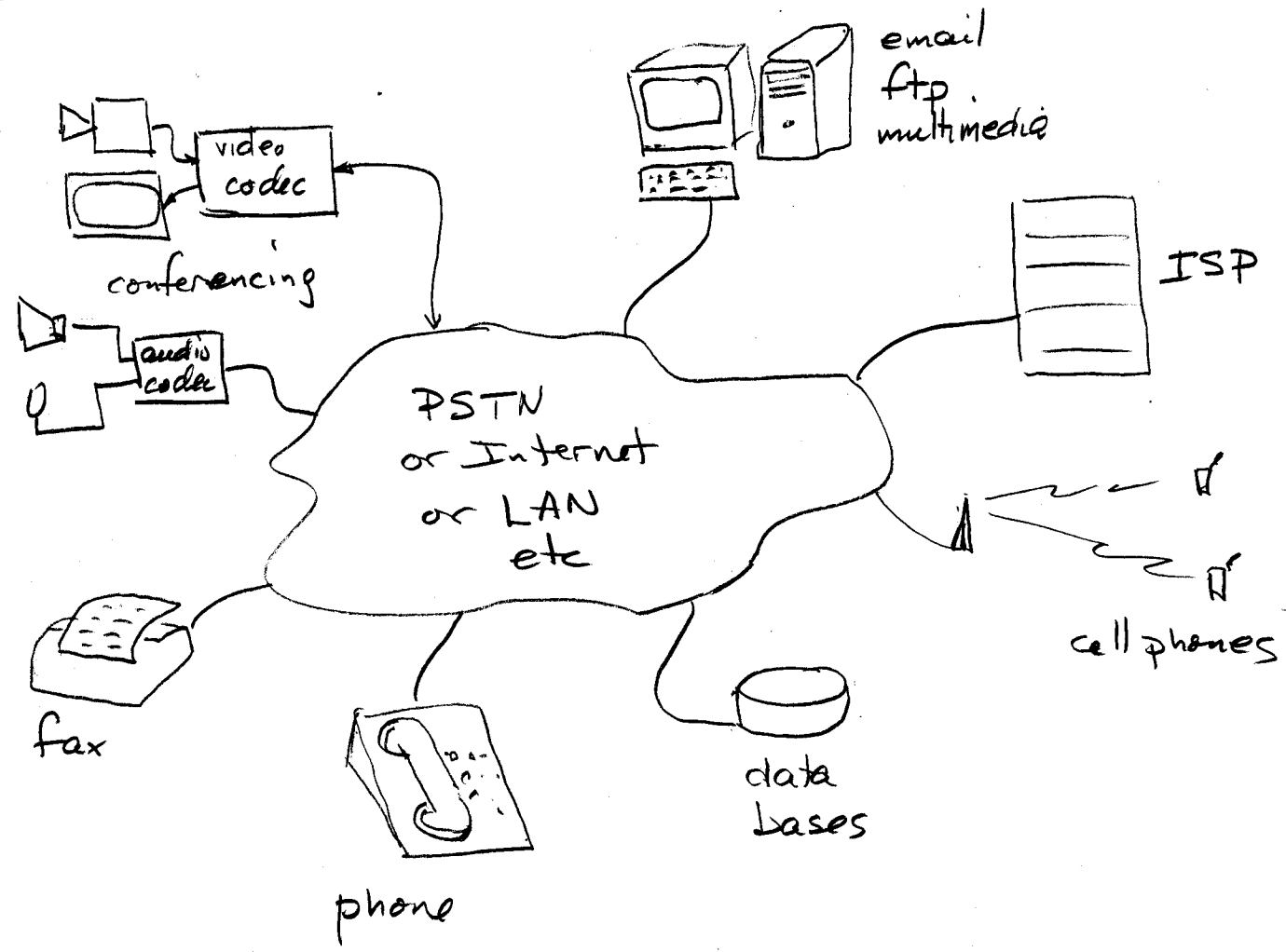
I want you to gain:

- an intuitive understanding of signal/detection in noise, so you can work in unfamiliar problems
- analytical ability to describe and design communication systems
- some exposure to typical systems and a toolkit of algorithms

1. DIGITAL COMMUNICATIONS - CONTEXT

Read P&S Chapt 1

1.1 Digital - A Universal Format



- Even inherently analog source signals are converted to bits for uniform methods of transmission, transformation, storage

- In this course, we examine the links that comprise the network;

- the signals
- the processing methods
- the challenges

1.2 Digital Modulation Formats

1.2.1

- Many digital signalling formats follow common sense. We can invent a few here.
- Lowpass (baseband) signals to convey a sequence of bits

checklist

NRZ

ASK

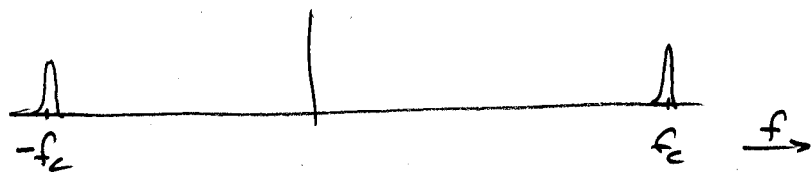
pulse shaped

Manchester

time & freq

Intentionally blank

• Carrier modulation (bandpass)



How can we modulate a carrier

$$A \cos(2\pi f_c t + \phi)$$

to convey a sequence of bits?

Check list

OOK

BPSK

QPSK

FSK

QAM

Intentionally blank

1.2.4