



# APECE-302: Radio & Television Engineering

## Applied Physics, Electronics & Communication Engineering

Lecture # 01



University of  
Dhaka | APECE  
DU

**Course Teacher:** Dr. S.M. Riazul Islam

**Date:** 2012 Year, 04 Month, 17 Day



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# Course Introduction

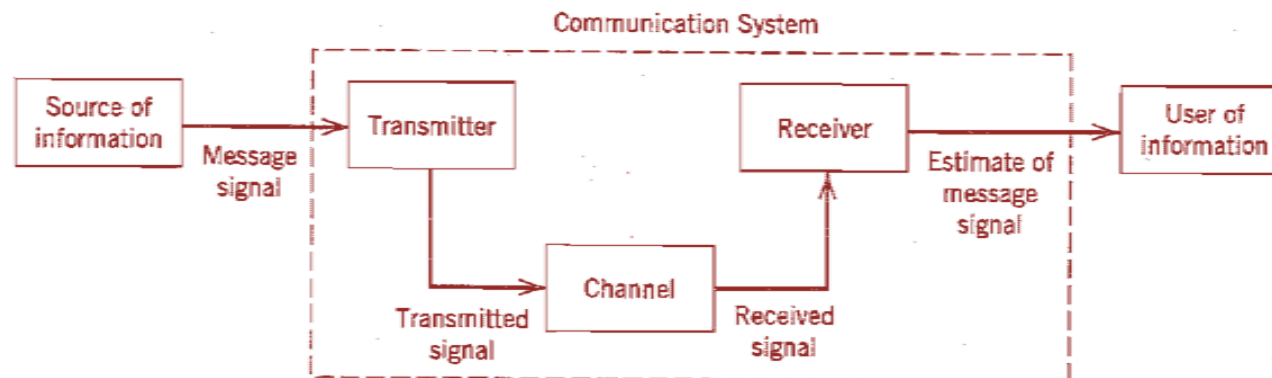
- Course Title: Radio and Television Engineering
- Course Code: APECE-302
- Credits: 3
- Evaluation**
  - Attendance: 4
  - HW and Team Project: 5
  - In-course exam: 15
  - Final Exam: 56
- Schedule**
  - 25-30 Lectures: Radio
  - In-course after 15/20 Lectures if not assigned by exam committee
  - 15-20 Lectures: TV

# Course Introduction

- ❑ Reference Books:
  - ❑ Communication Systems- Simon Haykin
  - ❑ Principles of Communication: System, Modulation and Noise- R.E. Ziemer, W.H. Tranter
  - ❑ Wireless Communications- Andrea Goldsmith
  - ❑ Principles of Communication System- Herbert Taub, D.L. Schilling
  - ❑ Monochrome and Colour Television- R.R. Gulati
  - ❑ Fundamental of Digital Television Transmission- Gerald W. Collins

# Communication Process

- ❑ Communications applications and area
- ❑ Tx-to-Rx
  - ❑ Message signals: voice, music, computer data, picture, video, volume data
  - ❑ Symbols: Electrical, aural or visual
  - ❑ Encoding
  - ❑ Decoding and reproduction
  - ❑ Re-creation
- ❑ Elements? Modes=Broadcast & pt-to-pt



# Communication Resources

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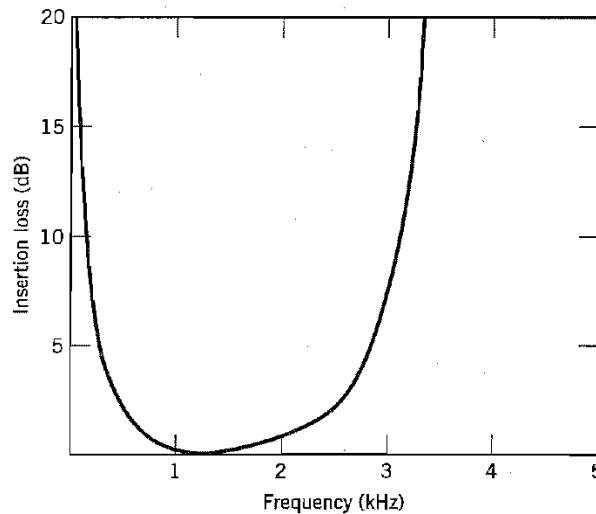
- Tx power and Channel BW
  
- Band limited (Telephone circuit) and Power limited (space com link or satellite channel)
  
- Voice articulation over 300 to 3100 Hz
  
- Noise(external or internal)
  
- SNR and dB

# Communication Channels

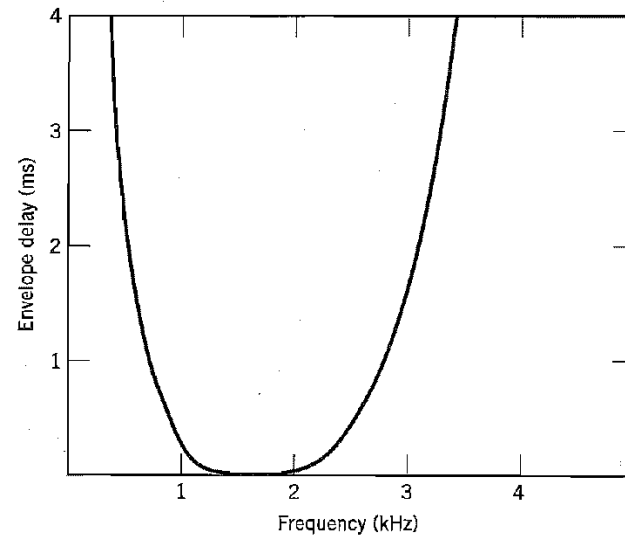
- ❑ Free space or Guided
- ❑ Telephone channel (Band limited); Coaxial cable, Optical Fiber



EMI Immunity

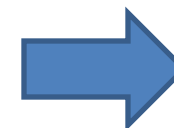


(a)



(b)

- ❑ Wireless channel, mobile radio, satellite channel



Linearity  
Time variance  
Resource Limit

# Modulation Process

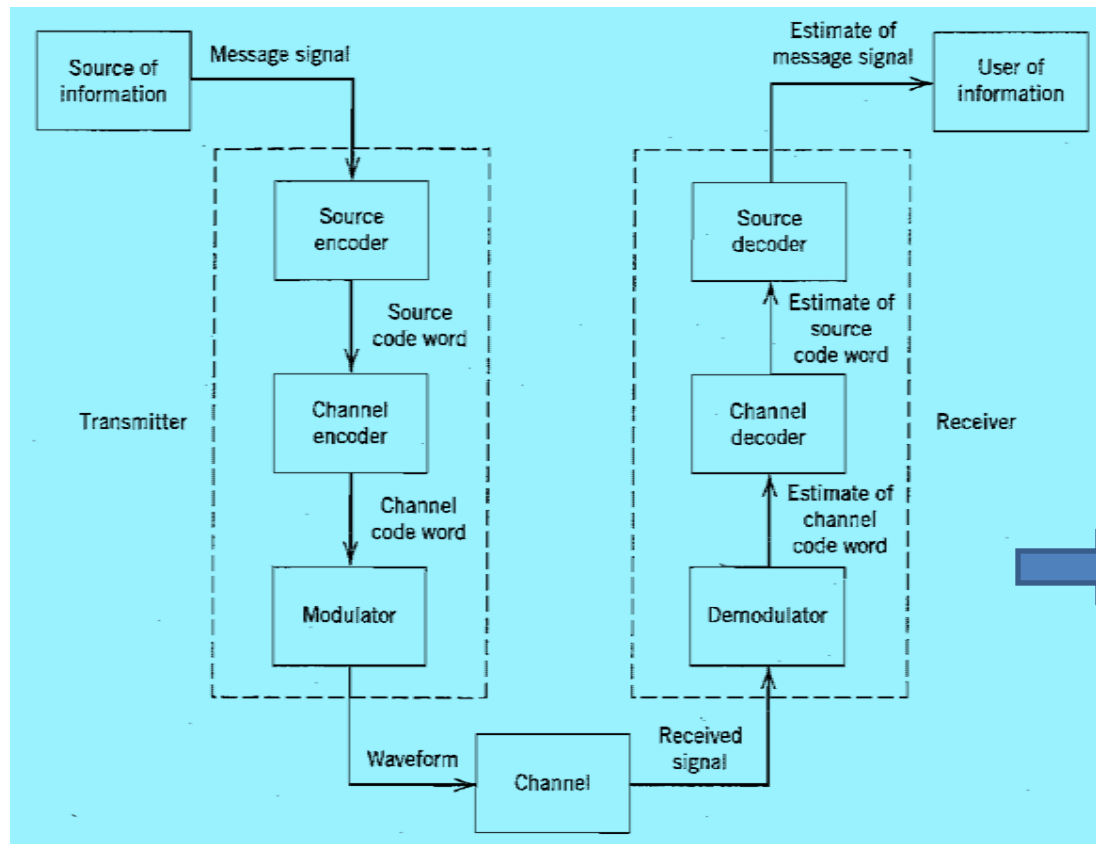
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- What and Why?
  
- How?
  
- Continuous Wave Modulation (CWM): AM, FM
  
- Pulse Modulation: PAM, PDM, PPM (Analog); PCM (Digital)
  
- Multiplexing: FDM, TDM, CDM



# Analog and Digital Communications

## ❑ Digital



## ❑ Analog?

- ❑ Modulation & Demodulation
- ❑ Simple but stringent requirements: linearity & system adjustment

Channel characteristic matching

Still Analog?

# Shannon's Capacity Theorem

Information capacity  
of the channel

Channel BW

$$C = B \log_2(1 + \text{SNR}) \text{ b/s}$$

- ❑ Efficiency of a digital com sys  $\eta = \frac{R}{C}$
- ❑ Trade-off between channel BW and SNR
- ❑ Idealized framework for performance comparisons

# Q & A

