

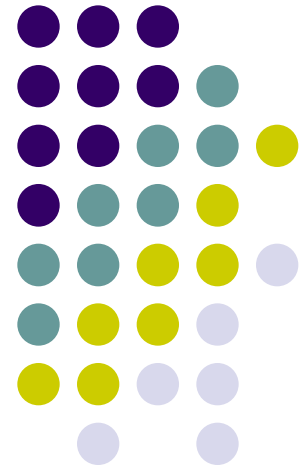


# Digital Communications & Information Transmission (CoE331)

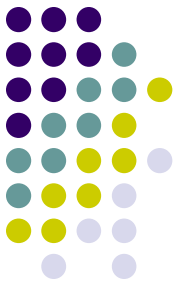
Computer Engineering Department  
College of Engineering, University of Basrah,

**Year 3**  
Prepared by

**Assistant Prof. Dr. Ghaida A. AL-Suhail**  
**2015-2016**



# Introduction



- Welcome
- Syllabus
- Recommended Textbooks
- Introduction on Course Topics:
  - **Data Communications**      اتصالات البيانات
  - **Digital Communications**      اتصالات رقمية

## Definitions: تعاريف اساسية

**Data** = Information is stored in digital form. (Datum → **single unit**)

**Data Communication** = is process of transferring digital information (usually in Binary) between two or more points.

**Information** = means Knowledge or intelligence.  
when Information has been **processed, organized and stored** →  
is called Data.

# Course Topics

---

- **Introduction to Digital Communication:** Signals, bit rate vs bandwidth, Sampling theory, Channel capacity, Pulse Modulations (PAM, PWM, PCM, delta modulation), line code, Type of Multiplexing: TDM, FDM, Digital Modulation (Transmission): ASK, FSK, PSK, QAM, Performance of Digital Receiver: BER (Bit-error rate), SNR, Transmission Impairments: Noise types, losses (optical, coaxial, and radio)
- **Introduction to Protocols and Architectures:** OSI Model and TCP/IP Model
- **Transmission Media:** Guided (twisted-pair, coaxial, optical fibers) and Unguided media, Optical Transmission system. Satellite Communications
- **Data encoding and Spread Spectrum:** Direct-Sequence, Frequency and Time Hopping
- **Data Communication Interface:** Asynchronous/Synchronous transmission, Serial/Parallel transmission, Interfacing RS232, DTE-DCE of point-to-point link, USARTs, direction of data flow, transmission rate
- **Data-Link Control:** Flow control, error control techniques: check-sum, summation code, Hamming code, CRC, block codes, packet format, HDLC, bit-oriented, character-oriented transmission.
- **Multiplexing Techniques:** Store-and-Forward (message/packet switching), circuit switching, datagram and virtual-circuit packet switching.
- **Mobile Communications Cellular Phone Systems:** Mobile Cellular System, Definitions of Handoff, Roaming, Frequency reuse, Microcell/Macro cell, System Capacity, An example AMPS (1G) and High Speed Access: ADSL



# Textbooks



- W. Stallings, **Data and Computer Communications**, 8<sup>th</sup> Edition, International 2009. (PDF)
- B. Forouzan, **Data Communications and Networking**, 3<sup>rd</sup> Ed. 2003 (2007) (PDF)
- W. Tomasi, **Introduction to Data Communications and Networking**, 2005. (الكتب المجانية)
- J. Walrand, **Communication Networks: A First Course**, 1991
- A. Carlson, **Communication Systems**, 1998
- G. Keiser, **Local Area Networks**, 1988.