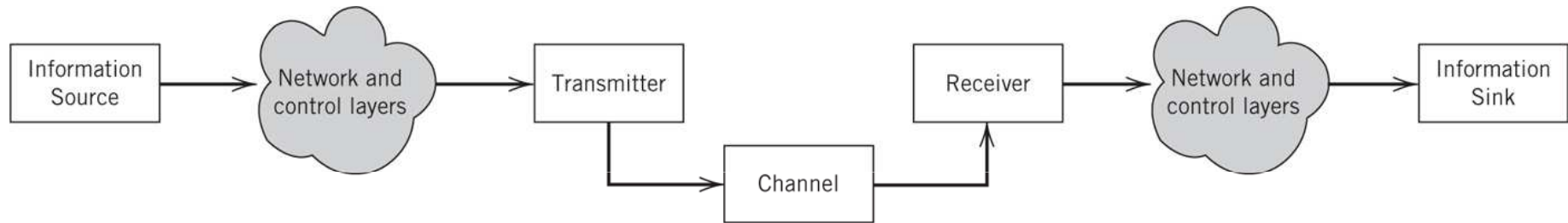




Chapter 1 Prologue

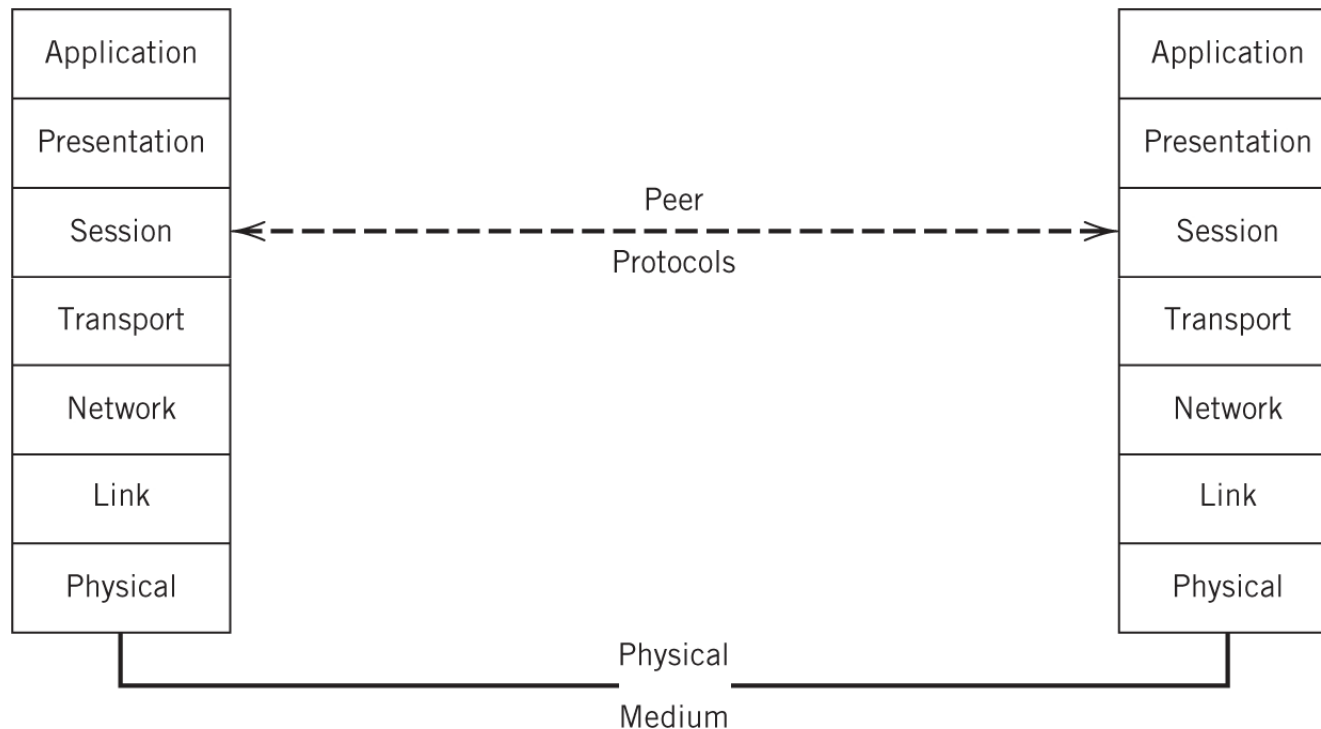
Lecturer: David Shiung

How Is a Communication System Organized ? (1/1)



- Elements of a communication system

The Layered Approach (1/2)



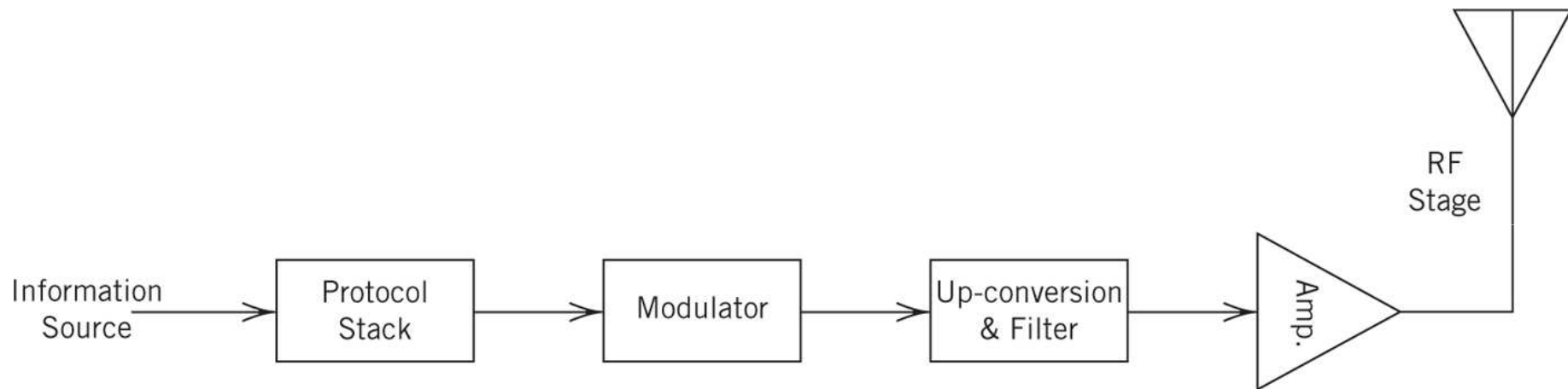
- Peer processes in seven-layer Open Systems Interconnect (OSI) model for computer communications



The Layered Approach (2/2)

- Each layer of the stack represents a protocol
- OSI model simplifies the design of communication systems and permits independent development of different functions
- This book focuses on the physical layer of the telecommunications process. With analog information, the boundary between the physical layer and other layers may be somewhat blurred
- Claude E. Shannon (1916-2001): the father of information theory

Theme Example – Wireless Communications (1/4)



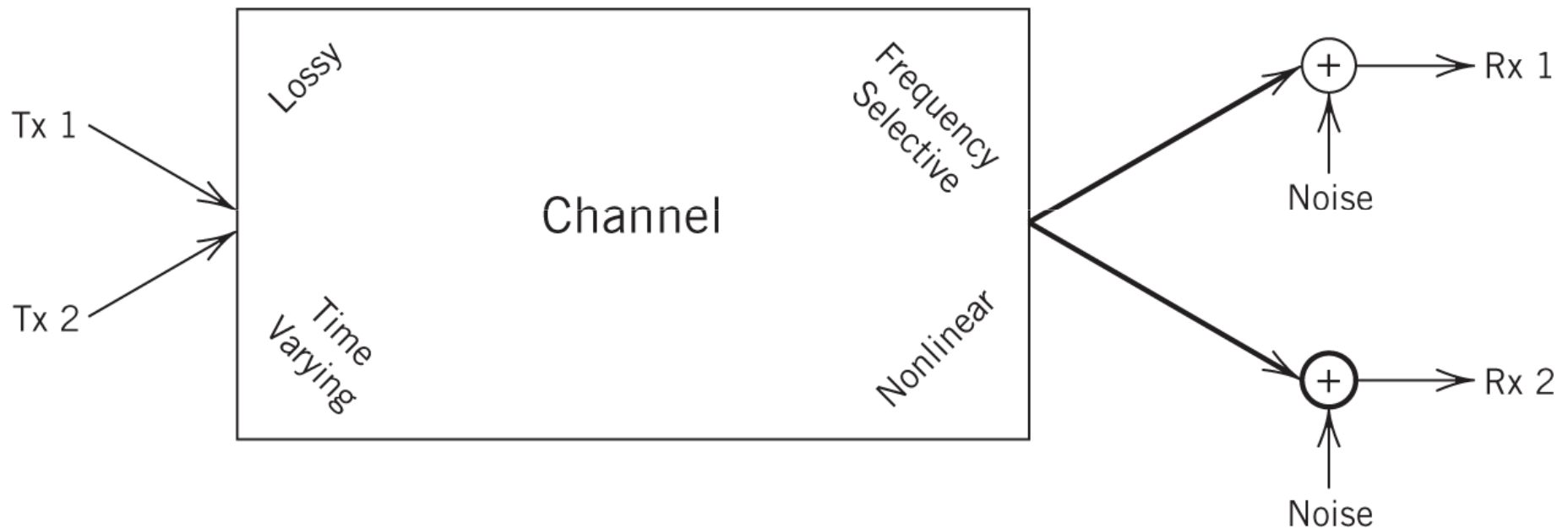
- Illustration of basic components of a radio transmitter
- The modulator is typically implemented using digital signal-processing technology



Theme Example – Wireless Communications (2/4)

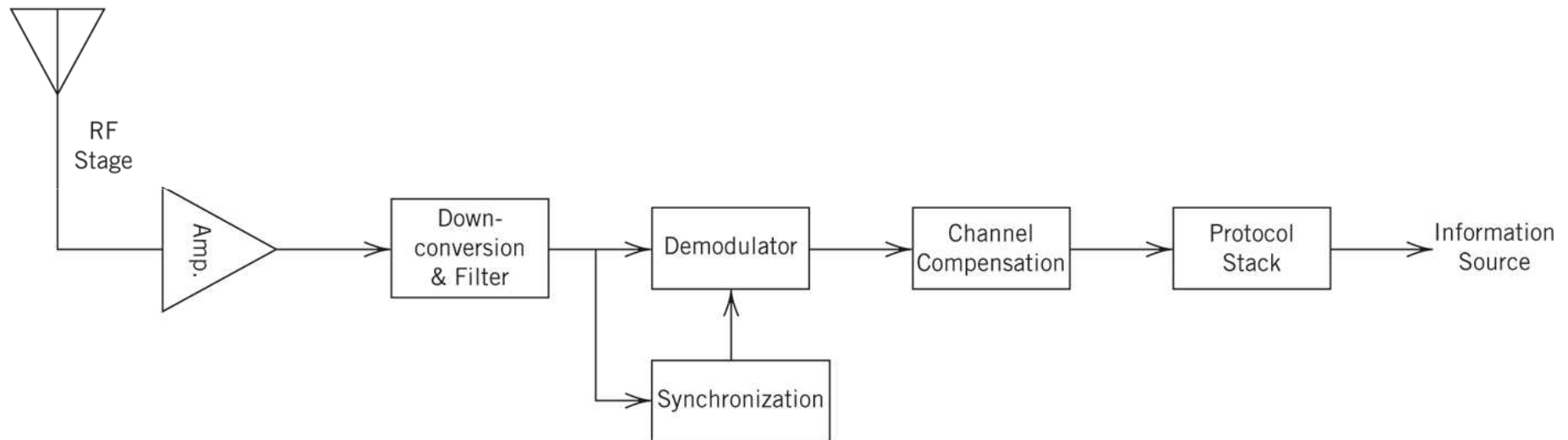
- FPGA: field-programmable gate array
- SDR: software-defined radio. A well-designed up-conversion and RF stage could potentially transmit any one of a number of different modulation techniques
- Imperfection of communication channels:
 - Propagation loss
 - Frequency selectivity
 - Time-varying
 - Nonlinear
 - Shared usage
 - Noise

Theme Example – Wireless Communications (3/4)



- Illustration of channel impairments

Theme Example – Wireless Communications (4/4)



- Illustration of radio receiver