# Outline of Slides

1. **CH 1. Intro to Networking** 
   1. What is the internet
   2. Network Edge
      * End systems, access networks, links
   3. Network Core
      * Packet Switching, circuit switching, Network Structure
   4. Delay, Loss, throughput in networks
   5. Protocol layers, service models
   6. Networks under attack: security
   7. History
2. **CH 2. Application layer**
   1. Principles of network applications
   2. Web and HTTP
   3. Electronic mail
      * SMTP, POP, IMAP
   4. DNS
   5. P2p Applications
   6. Video streaming and content distribution networks (CDNs)
   7. Socket programming with UDP and TCP
3. **CH 3. Transport layer**
   1. Transport-layer services
   2. Multiplexing and multiplexing
   3. Connectionless transport: UDP
   4. Principles of reliable data transfer
   5. Connection-oriented transport : TCP
      * Segment structure
      * Reliable data transfer
      * Flow control
      * Connection management
   6. Principles of congestion control
   7. TCP congestion control
4. **CH 4. Network layer: Data plane**
   1. Overview of network layer
      * Data plane
      * Control plane
   2. What’s inside a router
   3. IP: internet protocol
      * Datagram format
      * Fragmentation
      * Ipv4 addressing
      * Network address translation
      * Ipv6
   4. Generalized forward SDN
      * Match
      * Action
      * OpenFlow examples of match-plus-action in action
5. **CH 5. Network Layer: Control plane**
   1. Intro
   2. Routing protocols
      * Link-state (Dijsktra’s)
      * Distance vector
   3. Intra-AS routing in the internet: OSPF
   4. Routing among the ISPs: BGP
   5. The SDN control plane
   6. ICMP: The Internet Control Message Protocol
   7. Network management and SNMP
6. **CH 6. Link Layer and LANs**
   1. Introduction, services
   2. Error detection, correction
   3. Multiple access protocols
   4. LANs
      * Addressing, ARP
      * Ethernet
      * Switches
      * VLANS
   5. Link Virtualization: MPLS
   6. Data center networking
   7. A day in the life of a web request
7. **CH 7. Wireless and Mobile Networks**
   1. Intro

WIRELESS

* 1. Wireless links, characteristics
     + CDMA
  2. IEEE 802.11 wireless LANs (“Wi-Fi”)
  3. Cellular Internet Access
     + Architecture
     + Standards (3g, LTE, etc.)

MOBILITY

* 1. Principles: Addressing and routing to mobile users
  2. Mobile IP
  3. Handling mobility in cellular networks
  4. Mobility and higher-layer protocols

1. **CH 8. Security**
   1. What is network security?
   2. Principles of cryptography
   3. Message integrity, authentication
   4. Securing e-mail
   5. Securing TCP connections: SSL
   6. Network layer security: IPsec
   7. Securing wireless LANs
   8. Operational security: firewalls and IDS
2. **Bluetooth**
   1. Piconet: collection of Bluetooth devices synchronized on the same hopping frequency