Introduction to Next-Generation Wireless Networks

- Instructor
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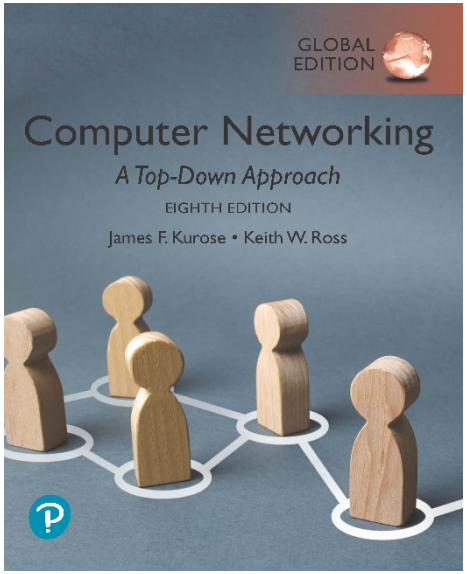
- Teaching Time & Classroom
  - Monday 10:20 a.m. ~ 12:10 p.m. (研揚大樓TR-310-1)
  - Thursday 11:20 a.m. ~ 12:10 p.m. (研揚大樓TR-310-1)

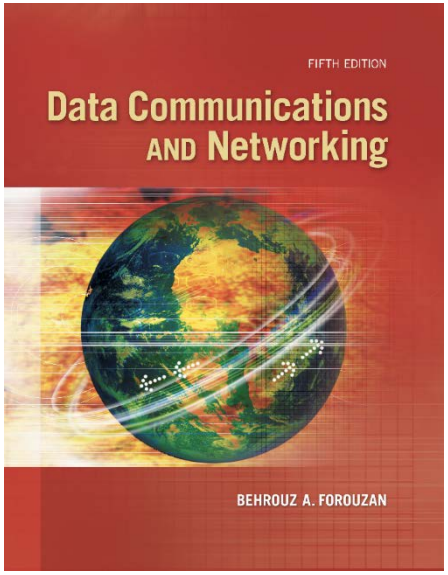
- TA
  - 張宥森 (B11032053@mail.ntust.edu.tw)
  - 林翊安 (B11015023@mail.ntust.edu.tw)
  - Office Number: E1-201-1

Introduction to Next-Generation Wireless Networks

- Reference Textbooks
  - Jim Kurose, Keith Ross, "*Computer Networking: A Top Down Approach*," Pearson.
  - Behrouz A. Forouzan, "*Data Communications and Networking*," McGraw-Hill Education.



Jim Kurose, Keith Ross



Introduction to Next-Generation Wireless Networks

- Grading
  - Midterm Exam 30%
  - Final Exam 30%
  - Term Project 40%
  - Bonus (Quiz) 10%
- To be fair to all students, this course has no make-up exams.

Course Outline

- Wireless and Mobile Networks
  - Wireless Links and Network Characteristics
  - WiFi: 802.11 Wireless LANs
  - Cellular Networks: 4G and 5G
  - Mobility Management: Principles

- Security in Computer Networks
  - Principles of Cryptography
  - Message Integrity and Digital Signatures
  - End-Point Authentication
  - Securing E-Mail
  - Securing TCP Connections: TLS
  - Securing Wireless LANs and 4G/5G Cellular Networks

Course Outline

- Computer Networks and the Internet
  - What Is the Internet?
  - The Network Edge/The Network Core
  - Delay, Loss, and Throughput in Packet-Switched Networks
  - Protocol Layers and Their Service Models
  - Networks Under Attacks

Course Outline

- The Link Layer and LANs
  - Introduction to the Link Layer
  - Error-Detection and –Correction Techniques
  - Multiple Access Links and Protocols
  - Switched Local Area Networks
  - Link Virtualization: A Network as a Link Layer
  - Data Center Networking

Course Outline

- Network Layer
  - Data Plane
    - Overview of Network Layer
    - What's Inside a Router?
    - The Internet Protocol (IP): IPv4, Addressing, IPv6, and More
    - Generalized Forwarding and SDN
    - Middleboxes
  - Control Plane
    - Routing Algorithms
    - Intra-AS Routing in the Internet: OSPF
    - Routing Among the ISPs: BGP
    - The SDN Control Plane
    - ICMP: The Internet Control Message Protocol

Course Outline

- Transport Layer
  - Introduction and Transport-Layer Services
  - Multiplexing and Demultiplexing
  - Connectionless Transport: UDP
  - Principles of Reliable Data Transfer
  - Connection-Oriented Transport: TCP
  - Principles of Congestion Control
  - TCP Congestion Control

Course Outline

- Application Layer
  - Principles of Network Applications
  - The Web and HTTP
  - Electronic Mail in the Internet
  - DNS-The Internet's Directory Service
  - Peer-to-Peer Applications
  - Video Streaming and Content Distribution Networks
  - Socket Programming: Creating Network Applications