INST 346 Exam 2 Study Guide

Exam coverage.
- The focus of exam 2 is on issues covered after Exam 1. General knowledge from before Exam 1 that can provide context for material covered since Exam 2 is testable, but issues covered only before Exam 1 will not be the focus of questions on Exam 2. For example, you would need to understand the difference between the application layer and the network layer, and you would need to know that HTTP was an application layer protocol, but Exam 2 would not ask for details about the HTTP protocol.
- Material covered in assigned readings, in class, in homeworks, and on labs is testable.
- Programming or running Wireshark won't be required, but interpreting programs or explaining Wireshark results may be.

TCP (Only the following topics, which were not on Exam 1)
- Flow control
- Setting the timeout
- Connection close

Routers
- Separation of data and control planes
- Data plane design (input buffer, bus switch, output buffer)
- Queueing (FIFO, weighted fair queueing)

IP
- Hierarchical IP address space
- DHCP
- IPv4 addresses and "Datagram" format
- Fragmentation
- Network address translation
- IPv6
- Tunneling

Routing
- Routing tables (longest prefix matching)
- Autonomous systems
- Shortest path routing
- Border Gateway Protocol (BGP)

Point to Point
- Physical layer (twisted pair, coaxial cable, fiber, microwave, satellite)
- Error detection (CRC)
- Error correction

Ethernet
- Subnets
- CSMA/CD
- MAC addresses

- ARP
- Ethernet frame structure
- Switched Ethernet

WiFi
- CSMA/CA (SIFS, DIFS, RTS, CTS)
- Physical layer issues (signal strength, multipath, interference, hidden terminal)
- Adaptive rate selection
- Association (SSID)
- 802.11 frame structure
- Power management

Mobile Data
- 4G architecture
- Combination of FDMA and TDMA
- CDMA
- Handoffs
- Roaming mobility (indirect routing)

Hacking
- Bots and botnets
- Distributed denial of service attacks
- Ransomware
- Social attacks
- Disinformation

Firewalls
- Firewalls (stateful, stateless)
- Gateways
- Intrusion detection