My Background

- PhD - Computer Science dept, UMass Amherst (1999)
- Bell Labs research (1999 - 2003)
- research interests - computer networks (since 1989)
  - mobile and pervasive systems, wireless networks
  - network security
  - overload control
  - multicast
  - measurement, modeling, inferencing
What is this course about?

*Comprehensive introduction* to computer networks
- learn *principles* of computer networking
- learn *practice* of computer networking
- Internet architecture/protocols as case study

**Goals:**
- learn a lot (not just factoids, but principles and practice)
- have fun (well, it should be interesting, at least)

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Course Information

- **Who is this course for?**
  - Undergrads/Grads
- **Prerequisites:**
  - good programming skills, some knowledge of Unix (or Unix-like) operating system
- **Course materials:**
  - class notes (*modified version of slides provided by Jim Kurose & Keith Ross*)
  - cs6480 - additional reading material
Course Information (more)

- **Class WWW site:**
  - Important piece of info!
  - www.eng.utah.edu/~cs5480

- *everything* will be posted on this site!
  - syllabus
  - TA info
  - class notes (pdf)
  - assignments

nothing will be handed out in class :-)  

Course Information (more)

- **Mailing Lists:**
  - cs5480@list.eng.utah.edu: announcements & discussions
  - join by going to http://sympa.eng.utah.edu
  - teach-cs5480: do not join, use only for questions to Prof & TA

**Workload:**

<table>
<thead>
<tr>
<th>Coursework</th>
<th>approx</th>
<th>approx %</th>
</tr>
</thead>
<tbody>
<tr>
<td>written homeworks</td>
<td>4</td>
<td>25%</td>
</tr>
<tr>
<td>programming ass'ns</td>
<td>3</td>
<td>25%</td>
</tr>
<tr>
<td>midterm</td>
<td></td>
<td>25%</td>
</tr>
<tr>
<td>final exam</td>
<td></td>
<td>25%</td>
</tr>
</tbody>
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Course Information (more)

- Cheating: read, sign, and return the CS5480 cheating policy document
- TA: Hema Bhatia
- TA’s Office hours: Wednesday 11:30 AM – 1:00 PM
- Professor’s office hours: Tuesday 10:30 -11:30 AM in 3408 MEB
- ask questions by sending email to the mailing lists

Course Information (more)

- Approximate Grading guidelines:
  - 90-100 A
  - 80-89 A-
  - 70-79 B-, B, B+
  - 60-69 C-, C, C+
  - 50-59 D-, D, D+
  - < 50 (or caught cheating) E

  The ranges as well as the thresholds will be shifted/changed depending on the overall performance of the class in tests, homeworks, and programming assignments

- in-class style: interaction, questions (please!)
- students are not expected to read class notes in advance

Questions, comments, … ???
Course Overview:

Part 1: Introduction (2 classes, text: Chapter 1)
- What is the Internet, what is a protocol?
- Network edge, network core, network access
- Delay, loss in packet-switched networks
- Protocol layers, service models, security
A top-down approach:

We’ll cover networking top-down
- **end-system** applications, end-end transport
  - **network core**: routing, hooking nets together
  - **link-level** protocols, e.g., Ethernet
  - other stuff: security, management, multimedia

Course Overview:

**Part 2: Application Layer (2-3 classes, text: Ch. 2)**
- Principles of network applications
- Web & HTTP
- File transfer: FTP
- Electronic mail in the Internet
- The Internet’s directory service: DNS
- P2P File Sharing
- Socket programming
Course Overview:

Part 3: Transport Layer (3 - 4 classes, text Ch. 3)
- Transport-layer services and principles
- Multiplexing and demultiplexing applications
- Connectionless transport: UDP
- Principles of reliable data transfer
- TCP case study
- Principles of congestion control
- TCP congestion control

Course Overview:

Part 4: Network Layer (4 classes, text: Ch. 4)
- Network service model
- Routing principles
- Hierarchical routing
- IP: the Internet Protocol
- Routing in the Internet
- What’s inside a router?

MIDTERM EXAM
Course Overview:

Part 5: Link Layer, LANs (3 classes, text: Ch. 5)
- Introduction, services
- Error detection, correction
- Multiple access protocols, LANs
- LAN addresses, ARP
- Ethernet
- Hubs, bridges, switches
- ATM networks & MPLS

Course Overview:

Part 6: Wireless & Mobile Networks (2 classes, text Ch. 6)
- Wireless links, characteristics
- IEEE 802.11 wireless LANs
- Cellular Internet Access
- Mobility: Principles, addressing and routing to mobile users
- Mobile IP
- Mobility in cellular networks
- Mobility and higher layer protocols
Course Overview:

Part 7: Network Security (3 classes, text: Ch. 8)
- What is network security?
- Principles of cryptography
- Authentication: Who are you?
- Integrity
- Key distribution, certification
- Firewalls
- Attacks, counter-measures
- Case studies: secure e-mail, SSL, IPsec, 802.11 WEP

Course Overview:

Part 8: Multimedia Networking (as much as possible, text: Ch. 7)
- Multimedia Networking Applications
- Streaming Stored Audio and Video
- Making the Best of the Best-Effort Service
- Beyond Best Effort
- Scheduling and Policing Mechanisms
- Integrated & Differentiated Services
- RSVP

FINAL EXAM
I keep six honest serving men. They taught me all I knew. Their names are What and Why and When and How and Where and Who.

-- Rudyard Kipling