CMPSCI 453
Computer Networking

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What is this course about?

*introductory* (first) course in computer networking
- learn *principles* of computer networking
- learn *practice* of computer networking
- Internet architecture/protocols as case study
  - by the time you are finished ......

**Goals:**
- learn a lot (not just factoids, but principles and practice)
- have fun! (learn how to spoof mail, sniff network traffic, write cool network apps, and more)
Course information

- introductory (first) course in computer networking
- who is this course for?
  - undergrads, MS students
- prerequisites:
  - algorithms, operating systems, programming skills
- course materials:
  - Lecture notes, additional reading, and videos posted on class site
Course information (more)  Make sure you can access both TODAY!

- Class site:
  - Moodle (accessible with a UMass OIT account)
  - Class discussions: Piazza (sign up with any email address)
  - Course material (except solutions) also openly accessible at: http://www.cs.umass.edu/~arun/cs453

- Everything posted on class site: syllabus, TA info, lecture slides (powerpoint, pdf), assignments, old exams, etc. nothing except exams will be handed out in class :-)

Course information (more)

- **workload:**

<table>
<thead>
<tr>
<th>Coursework</th>
<th>approx amount</th>
<th>approx %</th>
</tr>
</thead>
<tbody>
<tr>
<td>written homeworks</td>
<td>5-6</td>
<td>25%</td>
</tr>
<tr>
<td>programming (any language)</td>
<td>2</td>
<td>20%</td>
</tr>
<tr>
<td>lab assignments (Wireshark)</td>
<td>5</td>
<td>15%</td>
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<tr>
<td>Midterm</td>
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<td>15%</td>
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<tr>
<td>Final</td>
<td></td>
<td>25%</td>
</tr>
<tr>
<td>Class participation</td>
<td></td>
<td>up to 15%</td>
</tr>
</tbody>
</table>

- *iClicker required for class participation starting next week. Get one and register on the Moodle site THIS WEEK*
Course information (even more)

Odd and ends...

- me
- in-class style: interactive, ask questions!
- incomplete policy: None
- academic honesty: required reading at this URL
  - http://www.umass.edu/dean_students/codeofconduct/acadhonesty/
- getting into this course...

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
- physical media
- delay, loss in packet-switched networks
- protocol layers, service models
- Internet backbones, NAPs and ISPs
- brief history of networking, Internet
A top-down approach:

We’ll cover networking top-down

- end-system applications
- transport: TCP/UDP
- network core: routing, hooking nets together
- link-level protocols, e.g., Ethernet
- other stuff: security, mobility, management,
Course Overview:

Part 2: Application Layer (4 classes, text: Ch. 2)
- principles of application-layer protocols
- World Wide Web: HTTP
- file transfer: FTP
- electronic mail in the Internet
- the Internet's directory service: DNS
- socket programming

PROGRAMMING ASSIGNMENT 1
Course Overview:

Part 3: Transport Layer (6 classes, text Ch. 3)
- Transport-layer services and principles
- Multiplexing and demultiplexing applications
- Connectionless transport: UDP
- Principles of reliable of data transfer
- TCP case study
  - PROGRAMMING ASSIGNMENT 2
- Principles of congestion control
- TCP congestion control
Course Overview:

Part 4: Network Layer (5 classes, text: Ch. 4)
- introduction and network service model
- what’s inside a router?
- routing principles (algorithms)
- hierarchical routing
- IP: the Internet Protocol
- Internet routing: RIP, OSPF, BGP
Course Overview:

Part 5: Link Layer, LANs (4 classes, text: Ch. 5)

- introduction, services
- error detection, correction
- multiple access protocols, LANs
- LAN addresses, ARP
- Ethernet
Course Overview:

Part 6: Wireless and Mobile Networks (3 classes, Ch 6)

- wireless link characteristics
- the wireless link:
  - 802.11
  - cellular Internet access
  - mobility principles
- mobility in practice:
  - mobile IP
  - mobility in cellular networks
Course Overview:

Part 7: Network Security (3 classes, text: Ch. 7)
- what is network security?
- principles of cryptography
- authentication: Who are you?
- integrity
- key distribution, certification
- firewalls
- attacks, countermeasures
- case studies: secure e-mail, SSL, IPsec, 802.11
End of course overview

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