CSC317 Computer Networks
Professor. Leon Tabak

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Calendar

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<th>TUE</th>
<th>WED</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>29</td>
<td>30</td>
<td>01</td>
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<td>Week 2</td>
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Our meeting times and places

My office is in Law 206C.
You may call me in my office at (319) 895 4294.

You may send me electronic mail at <l.tabak@ieee.org>.

I will be in my office and available to meet with you Monday through Friday from 3:00 p.m. until 3:30 p.m.

We will all meet together in the classroom in the mornings and in the laboratory in the afternoons.

<table>
<thead>
<tr>
<th>Where</th>
<th>When</th>
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<tbody>
<tr>
<td>Classroom</td>
<td>Law Hall 309</td>
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<tr>
<td></td>
<td>9 a.m. to 11 a.m.</td>
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<tr>
<td>Laboratory</td>
<td>Law Hall 113</td>
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<td></td>
<td>1 p.m. to 3 p.m.</td>
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**Textbooks**


**Etiquette for the Classroom**

Please show respect to your classmates, to me, and to the seriousness of our enterprise by exercising the following courtesies:

- Please give your attention to whomever is speaking. That'll be me some of the time, but it will be you some of the time too.

Did you bring a computer to class? Good. We will find ways to use your computer to accomplish the goals that we have set for ourselves in this course.

Now, please turn off the games. Close windows that are displaying news, electronic mail, and scores from the world of sports. Put the earbuds away.

- Please do not interrupt and distract the class by late entries, early departures, or by coming less than fully prepared to make your contribution to the class. If you anticipate a need to be absent or late, please notify me in advance of your anticipated absence. With all due respect to Admiral Grace Murray Hopper, excuses after the fact will not succeed.

- Tastes in music vary. Some people need more quiet than others in order to concentrate. I and your classmates would like to know that we, and not an MP3 player, have your attention when we speak to you. Keep these things in mind.

- Please refrain from bringing food or drink into the classroom or laboratory.

- Please refrain from the use of vulgar language.

- Please do not wear clothing or buttons that bear vulgar messages or images. Indeed, it is best to avoid wearing messages of any kind. Outside of the classroom, I will be happy to discuss with you any issue of the day. Inside of the classroom, it is rude to broadcast opinions unrelated to our subject because our work there does not allow anyone else to respond to your challenge (or to decline your invitation to debate).

- Please keep shoes on and hats off in the classroom. Leave your pajamas and bathrobe at home. Test the limits of social conventions if you must during the more than 80% of the week during which we shall be apart.
• Please demonstrate your love for your fellow man or woman with kind words and graceful gestures but delay other physical expressions of tenderness until our work is done and you have found a more private setting.

Policies

Cornell College is committed to providing equal educational opportunities to all students. If you have a documented learning disability and will need any accommodation in this course, you must request the accommodation(s) from the instructor of the course and no later than the third day of the term. Additional information about the policies and procedures for accommodation of learning disabilities is available on Cornell College's Web site [http://cornellcollege.edu/academic-affairs/disabilities/index.shtml].

Please also familiarize yourself with the college’s statement on academic honesty [http://www.cornellcollege.edu/student-affairs/compass/academic-policies.shtml#f] and its policies for dropping courses [http://www.cornellcollege.edu/registrar/gb-resources-student/add-drop.shtml]

Goals

We will give special attention to three of Cornell College's Educational Priorities and Outcomes: [http://www.cornellcollege.edu/catalogue/introducing-cornell-college/educational-objectives.shtml]

• Knowledge—you will gain familiarity with protocols for data communication, you will learn how layers of abstraction make the design of complex systems easier, and you will learn how to use a variety of tools for diagnosing problems on networks and building applications that use networks.

• Reasoning—you will learn how to trace the passage of a message from sender to receiver.

• Citizenship—in this project-oriented course you will learn how to collaborate with classmates. You will learn with one another and from one another.

Grades

Written work will be due on each day of the term except for the first day and the last day. Printed copies and electronic copies of your papers will be due at 9 a.m.

Experience presenting work to peers will be a central part of the course. Practice asking your teammates questions during their presentations, critiquing their decisions, and suggesting improvements to their code will also be an important part of your education during this term. We will schedule one day in each week of the term for you to present your work.

<table>
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<tr>
<th>Activity</th>
<th>Points</th>
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<tbody>
<tr>
<td>Daily work</td>
<td>20</td>
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<tr>
<td>Examination 1 (Friday, October 3)</td>
<td>20</td>
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<td>Examination 2 (Friday, October 10)</td>
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<td>Examination 3 (Friday, October 17)</td>
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<td>Examination 4 (Wednesday, October 22)</td>
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<td>+</td>
<td>100</td>
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Daily schedule

Monday, September 29

Read.

Read Sections 1.1–1.4 (pages 1–47).

Discuss.

Protocols, network edge and network core, physical media, circuit switching vs. packet switching, and multiplexing, delays and throughput.

Write.


Return to the top.

Tuesday, September 30

Read.

Read Sections 1.5–1.8 (pages 47–82).

Discuss.

The value of layers of abstractions, how malicious people can compromise networking services, the origins of networking technology, and the evolution of the Internet.

Write.

Solve problems P29 and P31 on pages 76–77 of *Computer Networking: A Top-Down Approach*

Return to the top.

Wednesday, October 01

Read.

Read Sections 2.1–2.2 (pages 83–116).

Discuss.

Peer-to-peer and client-server architectures, exchange of messages between processes, sockets, IP addresses and port numbers, requirements that distinguish network applications (including willingness to tolerate loss of data, slow throughput, long delays, and eavesdroppers), TCP and UDP transport protocols, and HTTP.

Write.

Solve problems P4 and P5 on pages 171 and 172 in *Computer Networking: A Top-Down Approach*.
Return to the top.

Thursday, October 02

Read.

Read Sections 2.37–2.5 (pages 116–144).

Discuss.

Protocols for the transfer of files, electronic mail, and finding the IP address that corresponds to a given hostname.

Write.


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Friday, October 03

Read.

Read Sections 2.6–2.8 (pages 144–183).

Discuss.

Peer-to-peer architectures, models of the performance of client-server and peer-to-peer systems, BitTorrent as an example of a peer-to-peer system, use of distributed hash tables for databases on peer-to-peer systems, and TCP and UDP socket programming.

Write.

Examination 1.


Return to the top.

Monday, October 06

Read.

Read Sections 3.1–3.3 (pages 185–204).

Discuss.

Communication between processes vs. communication between hosts, connection-oriented and connectionless transport, multiplexing and demultiplexing, and checksums.

Write.

Tuesday, October 07

Read.

Read Sections 3.4–3.5 (pages 204–258).

Discuss.

Modeling reliable transport with finite state machines, automatic repeat request (ARQ) protocols, stop and wait protocols, alternating bit protocols, pipelining, ACKS and NACKS, sequence numbers, Go-Back-N (GBN) and Selective Repeat protocols, and flow control.

Write.


Return to the top.

Wednesday, October 08

Read.

Read Sections 3.6–3.8 (pages 259–303).

Discuss.

How networks become congested, end-to-end and network assisted congestion control, Available Bit Rate (ABR) in Asynchronous Transfer Mode (ATM), TCP congestion control, and fairness.

Write.


Return to the top.

Thursday, October 09

Read.

Read Sections 4.1–4.3 (pages 305–331).

Discuss.

Forwarding and routing in the network layer, routers vs. packet switches, menu of network layer services, the Internet's best-effort service, virtual circuit vs. datagram networks, output port queueing, packet schedulers, and active queue management (AQM).

Write.

Friday, October 10

Read.

Read Section 4.4 (pages 331–363).

Discuss.

Construction of IPv4 datagrams, IPv4 addresses, subnets and submasks, Classless Interdomain Routing (CIDR), Dynamic Host Configuration Protocol (DHCP), Network Address Translation (NAT), Internet Control Message Protocol (ICMP), IPv6, tunneling, and IP security.

Write.

Examination 2


Monday, October 13

Read.

Read sections 4.5–4.6 (pages 363–399).

Discuss.

Least cost paths, global vs. decentralized routing algorithms, static vs. dynamic routing algorithms, load-sensitive vs. load-insensitive routing algorithms, link state (LS) algorithm, distance vector (DV) algorithm, intra-autonomous system routing vs. inter-autonomous system routing, Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Border Gateway Protocol (BGP).

Write.


Tuesday, October 14

Read.

Read Sections 4.7–4.8 (pages 399–432).

Discuss.

Broadcast vs. multicast routing, simplicity and drawbacks of N-way-unicast, uncontrolled vs. controlled flooding, spanning trees, and Distance-Vector Multicast Routing Protocol (DVMRP) and Protocol-Independent Multicast (PIM) routing protocol.
Write.


Return to the top.

**Wednesday, October 15**

Read.

Read Sections 5.1–5.3 (pages 433–461).

Discuss.

Nodes and links, menu of services at the link layer, network adapters, algorithms for detecting and correcting errors, multiple access protocols (channel partitioning, random access, and taking turns), code division multiple access (CDMA), ALOHA, and Carrier Sense Multiple Access (CSMA) protocols.

Write.

Solve problems P1, P3, and P5 on page 503 in *Computer Networking: A Top-Down Approach*.

Return to the top.

**Thursday, October 16**

Read.

Read Sections 5.4–5.5 (pages 461–490).

Discuss.

Physical addresses (also known as LAN or MAC addresses), Address Resolution Protocol (ARP), Ethernet, hubs, Ethernet frames, evolution of Ethernet, switches vs. routers, virtual local area networks, and multiprotocol label switching (MPLS) in the link layer.

Write.


Return to the top.

**Friday, October 17**

Read.

Read Sections 5.6–5.8 (pages 490–512).

Discuss.

Design of data centers, the many steps and protocols used to respond to a request for a Web page.
Write.

Examination 3.


Return to the top.

**Monday, October 20**

Read.

Read Sections 6.1–6.3 (pages 513–546).

Discuss.

Wireless networks, base stations, cell towers, and access points, multipath propagation, path loss, signal-to-noise ratio, code division multiple access (CDMA) protocols, and IEEE 802.11 wireless LAN.

Write.

Solve problems P1, P2, and P5 on page 580 in *Computer Networking: A Top-Down Approach*.

Return to the top.

**Tuesday, October 21**

Read.

Read Sections 8.1–8.2 (pages 671–688).

Discuss.

Meaning of secure communication, symmetric key vs. public key encryption, monoalphabetic vs. polyalphabetic ciphers, block ciphers, and the RSA algorithm.

Write.


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**Wednesday, October 22**

Read.

There is no reading assignment today.

Discuss.

There is no discussion scheduled for today.
Thursday, October 23

Read.

There is no reading assignment today.

Discuss.

We will not meet today.

Write.

There is no writing assignment today.

Return to the top.

Friday, October 24

Read.

There is no reading assignment today.

Discuss.

We will not meet today.

Write.

There is no writing assignment today.

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