Location: FPAT 267 (F. Paul Anderson Tower)
Time: TR 11:00 - 12:15 (Tuesdays and Thursdays)
URL: http://voip.netlab.uky.edu/~fei/teaching/cs571/index.html

Instructor
Zongming Fei
Office: 227 James F. Hardymon Building
Phone: (859)257-3202
e-mail: fei@cs.uky.edu
Office hours: TR 1:00 - 2:00 pm (or by appointment)

Course Description:
This course focuses on the principles of computer networks using current Internet technologies and protocols as examples. Topics include routing algorithms and protocols; end-to-end transport; flow control; congestion avoidance and control; mail, web, and file transfer protocols; designing and implementing applications using common network APIs. Advanced topics, included as time permits, include network security, multicast, and quality of service.

Prerequisites:
CS471G or other undergraduate networking class (CS485), or consent of the instructor

Student Learning Outcomes:
Students will develop knowledge and skills in computer networking. At the conclusion of the course, students will be able to:
1. Understand how information is forwarded through the Internet.
2. Understand why congestion arises and how it is dealt with.
3. Understand why routing is a challenge in large networks, and how the Internet meets that challenge.
4. Design and implement communication software using client/server model.
5. Implement a protocol from a given specification.

Required Materials/Textbook

Course Activities, Assignments and Grading
The grade will be determined by your performance on homework, programming assignments, participation in class, a midterm exam and a final exam. The tentative weights are as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Class participation</td>
<td>5%</td>
</tr>
<tr>
<td>Homework, Programming Assignments</td>
<td>45%</td>
</tr>
<tr>
<td>Midterm exam</td>
<td>20%</td>
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<tr>
<td>Final exam</td>
<td>30%</td>
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</table>
Final grades for undergraduate students will be assigned according to the following scale:
A=90-100%, B=80-89%, C=70-79%, D=60-69%, E=0-59%.

Final grades for graduate students will be assigned according to the following scale:
A=90-100%, B=80-89%, C=70-79%, E=0-69%.

Any grade normalization will be done against peer students, i.e. undergraduate students will only be normalized with undergraduate students, and graduate students with graduate students. No incomplete grades will be assigned unless there exist exceptional, extenuating circumstances.

Final Exam Information
Final exam: December 15, 2015 at 1:00pm (Tuesday)

Mid-term Grade
Mid-term grades for undergraduate students will be posted in myUK by the deadline established in the Academic Calendar (http://www.uky.edu/Registrar/AcademicCalendar.htm).

Course Policies
Submission of Assignments:
Late submissions of homework and programming assignments will not be accepted with the exception of excused absences.

Make-up Policy for Missed Work with an Excused Absence:
Students have one week following an excused absence to make up any missed graded work or exams.

Attendance Policy:
Attendance is mandatory. For each unexcused absence, two points will be deducted from the final average.

Excused Absences:
Students need to notify the professor of absences prior to class when possible. S.R. 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit “reasonable cause for nonattendance” by the professor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (859-257-2754).

Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.

Verification of Absences:
Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request “appropriate verification” when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence.

Academic Integrity:
Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: http://www.uky.edu/Ombud.
A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

Part II of Student Rights and Responsibilities (available online http://www.uky.edu/StudentAffairs/Code/part2.html) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else’s work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.

Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a students assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1).

Please note: Any assignment you turn in may be submitted to an electronic database to check for plagiarism.

Accommodations due to disability:

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address: jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

Additional Sources

The textbook will be supplemented with additional materials. Among them, RFCs (RFC stands for Request for Comments) will be used most frequently.

Here are some other textbooks:


Journals and magazines of interest include: IEEE/ACM Transactions on Networking, IEEE Journal on Selected Areas in Communications, Computer Communication Review, IEEE Network Magazine. Some major conference proceedings (SIGCOMM, INFOCOM, etc.) are also a good source to get up-to-date information about current research directions and topics.
Schedule

This schedule is tentative and subject to change. Rxxx stands for RFC (Request For Comment) xxx, which can be found at [http://www.ietf.org/rfc.html](http://www.ietf.org/rfc.html).

Please be advised that you are supposed to read the corresponding sections in the textbook and other listed materials before each class. Some of the contents will not be covered during the class meeting. We will discuss a substantial number of research papers to cover the most up-to-date technologies in the computer network field. I will post links to these papers in the class web site. It is your responsibility to download these papers and read them.

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<thead>
<tr>
<th>Week</th>
<th>Start From</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>08/27</td>
<td>Introduction, Motivation 1.1 – 1.5</td>
</tr>
<tr>
<td>2</td>
<td>09/01</td>
<td>Ethernet, CSMA/CD 2.6 Bridges 3.1.4</td>
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<tr>
<td>3</td>
<td>09/08</td>
<td>Internetworking 3.2, R791 IP - Addressing, Forwarding 3.2</td>
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<tr>
<td>4</td>
<td>09/15</td>
<td>IP - Fragmentation, ARP, ICMP 3.2 Fast IP lookup</td>
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<tr>
<td>5</td>
<td>09/22</td>
<td>IP Routing 3.3 Intra-domain routing: RIP, OSPF 3.3</td>
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<tr>
<td>6</td>
<td>09/29</td>
<td>Global Internet 4.1 BGP 4.1, R1771</td>
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<tr>
<td>7</td>
<td>10/06</td>
<td>IPv6 4.1 MPLS 4.3</td>
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<tr>
<td>8</td>
<td>10/13</td>
<td>flexible and midterm exam (date to be determined)</td>
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<tr>
<td>9</td>
<td>10/20</td>
<td>Transport, UDP 5.1, R768 TCP overview, sliding window, flow control 5.2, R793</td>
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<tr>
<td>10</td>
<td>10/27</td>
<td>Resource allocations, congestion avoidance mechanisms 6.1, 6.3 TCP Congestion Control 6.3, R2581</td>
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<tr>
<td>11</td>
<td>11/03</td>
<td>Application: HTTP/SMTP 9.1 R2616 Application: DNS/SNMP 9.3</td>
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<tr>
<td>12</td>
<td>11/10</td>
<td>Multicast 4.2 Overlay &amp; DHTs 9.4</td>
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<tr>
<td>13</td>
<td>11/17</td>
<td>Network security (DES, RSA) 8.1 – 8.3 Message integrity, PGP, firewall 8.4, 8.5</td>
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<tr>
<td>14</td>
<td>11/24</td>
<td>QoS 6.2</td>
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<tr>
<td>15</td>
<td>12/01</td>
<td>Multimedia Applications 7.2 SIP, RTP 9.2, 5.4, R1889</td>
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<tr>
<td>16</td>
<td>12/08</td>
<td>Introduction to Queueing Theory Flexible and review</td>
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<tr>
<td>17</td>
<td></td>
<td>Final exam at 1:00pm on Dec. 15, 2015 (Tuesday)</td>
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