CS6504: Advanced Networks

Course: CS 6504
Class: 2:30 – 3:45 pm MW
Room: Norris 210
URL: http://courses.cs.vt.edu/~cs6504/

Instructor: Dr. Srinidhi Varadarajan
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Course Objectives and Content

This course concentrates on research issues in the area of computer networks. It builds on the fundamentals of CS 5516. Key concepts that will be covered in the course include:

1. Application Layer: Network applications, protocols, application level framing
2. Transport Layer: Service Models, Congestion Control
3. Network Layer: Service Models, Routing algorithms, IPv6, Multicast
4. Link Layer
5. Multimedia Services: Application requirements, traffic models, Quality of Service issues, transport protocols for adaptive and hard real time traffic
6. Computer Security

The main goal of this course is introduce research issues in computer networking and foster the ability to perform independent research. Instruction is based on a traditional textbook approach supplemented with research papers and class discussion. Independent research surveys are a major component of this course.

Prerequisites

- CS5516 (Computer Networks)
- Strong programming ability in C
- User-level understanding of the UNIX operating system
- Ability to undertake substantial independent design projects
Resources

Required text:


Recommended text:

- Wright and Stevens, *TCP/IP Illustrated*, Vol 1. Addison Wesley

Additional resources:

- Listserv: CS6504_15089@listserv.vt.edu

*(All students are required to have email and WWW access)*

Grading

Semester grades will be determined after all work is completed and graded. Point ranges for letter grades may be based on a number of factors, including absolute and relative performance.

<table>
<thead>
<tr>
<th>Assignments</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>20%</td>
</tr>
<tr>
<td>Projects (2)</td>
<td>40% (20% each)</td>
</tr>
<tr>
<td>Final Project</td>
<td>40%</td>
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Assignments

All students are required to know how to create and send assignments electronically (using FTP). Assignments submitted after the due date will not be accepted unless there are extenuating circumstances and special arrangements are made prior to the due date.

**Homework:** Homework assignments will consist of research paper reviews, problems from the text, supplemental problems provided by the instructor and. Each week two research papers will be given for review. A one to two page summary of each paper is due the following week. Reviews will be graded on the basis on an understanding of the research issues and the contributions of the paper.

**Projects:** Projects involve programming assignments to gain a better understanding of the specific research issues. Projects require the design and implementation of network protocols and analysis of traffic traces to study their impact on network services. Projects should be submitted electronically.
Final Project: The final project involves a research survey paper or the design, implementation and validation of an “industrial strength” network service or application. A small list of suggested projects will be provided. A list of survey areas will be provided for the research survey. The result of the research survey should be a publication quality survey report. Students may pair up in groups of two (2) for the final project. For implementation projects, a project report is due on the completion of the final project.

Honor Code Policy

Adherence to Virginia Tech's honor code is expected in all phases of this class. All graded work is expected to be the original work of the individual student unless otherwise directed by the instructor. In working on problem sets, discussion and cooperative learning are allowed and, in fact, encouraged. However, copying or otherwise using another person's detailed solutions to assigned problems is an honor code violation. Projects are to be the work of the individual student. You may discuss general concepts, such as system calls, software libraries, Internet resources, or class and text topics, with others. However, discussion of project solutions, specific code, or detailed report content is an honor code violation. All source material used in project code and reports must be properly cited. Please discuss any questions that you may have about what is or is not permitted with the instructor.

Special Needs or Circumstances

Any students with special needs or circumstances should feel free to meet with or otherwise contact the instructor.