Computer Networks II
CS 4457 / 9657

Course Overview
Fall 2017

Lecture 1
Sept 12 2017
Course Intro: CS 4457B / 9657B

- Course Description / Topics to be covered in this course
- Course Prerequisite
- Course Structure and Grading Policy
- Q &A
Course Description

- This course will introduce some of the core technical functionalities within a Telco industry

- It will shed light on some of the technical / research challenges within these core functional domains

- Students will gain real life knowledge and experience through various research projects, discussion, and assignments

- Undergraduate students will be mainly involved in designing and developing a tool / prototype to address a specific high-value Telco industry problem

- Graduate students will be mainly involved in exploring a real world complex Telco research topic and working on a full fledge research paper that addresses a specific research problem

- In addition, this course is expected to assist the graduate students (who yet to identify their thesis topic) to find an interesting real world research problem that could be a good fit for their thesis
Course Description

Today’s ISP Network: An Example
Course Description: Topics to be covered

Major Functional Units in a Telco

- Product & Marketing
- Technology Development
- Network Planning
- Network Operations
- Network Economics
- Quality of Service
- Network Traffic Forecast
- Service / Product Costing
- Network Strategic Planning
- Network Forecast

Topics to be covered:

- Major Functional Units in a Telco
- Network Planning
- Technology Development
- Network Operations
- Network Economics
- Quality of Service
- Service / Product Costing
- Network Strategic Planning
- Network Forecast
- Network Traffic Forecast

Course Description: Topics to be covered
Course Intro: CS 4457B / 9657B

✓ Course Description / Topics to be covered in this course

☐ Course Prerequisite

☐ Course Structure and Grading Policy

☐ Q &A
Course Prerequisite

- This course is primarily designed for the senior year undergrad and graduate students who have some background in computer networks / distributed systems (such as CS 3357 - Computer Networks I)

- It also welcomes interested students from other relevant disciplines such as systems engineering, machine learning, and statistics

- If the students do not have background in the area of communication networks they are encouraged to discuss their interest with the course instructor to evaluate their eligibility for this course
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✓ Course Description / Topics to be covered in this course

✓ Course Prerequisite

☐ Course Structure and Grading Policy

☐ Q &A
## Course Structure & Grading Policy

<table>
<thead>
<tr>
<th>Course Component</th>
<th>Student Group</th>
<th>Description</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Paper Review (Assignments)</td>
<td>Undergrad / Grad</td>
<td>2 x research / technical paper review. Individual effort</td>
<td>2 x 10% = 20%</td>
</tr>
<tr>
<td>Project Proposal</td>
<td>Undergrad</td>
<td>2-3 pages project proposal. Individual or Group effort</td>
<td>15% + 10% = 25% (report + presentation)</td>
</tr>
<tr>
<td>Research Project Proposal</td>
<td>Grad</td>
<td>2-3 pages research project proposal. Group effort</td>
<td>15% + 10% = 25% (report + presentation)</td>
</tr>
<tr>
<td>Final Project</td>
<td>Undergrad</td>
<td>10-15 pages project report. Individual or Group effort</td>
<td>25% + 20% = 45% (report + presentation)</td>
</tr>
<tr>
<td>Final Research Project</td>
<td>Grad</td>
<td>10-15 pages research paper. Group effort</td>
<td>35% + 10% = 45% (report + presentation)</td>
</tr>
<tr>
<td>Class Participation</td>
<td>Undergrad / Grad</td>
<td>Individual in-class participation</td>
<td>10%</td>
</tr>
</tbody>
</table>
Assignments: Research Paper Review (20%)

- **Area of Research**
  - Network Traffic Forecast
  - Quality of Service (QoS)
  - Network Costing
  - Students are allowed to select a topic outside of the above areas

- **Two research papers from any of these areas**

- **What your Review should include**
  - What is the specific problem author/s trying to address / solve
  - Did they discuss and compared related work
  - What is the claimed contribution of their work
  - What is the Importance / significance of the claimed contribution
  - How did they approach the problem (i.e., proposed solution)
Assignments: Research Paper Review (20%)

- **What your Review should include**
  - Is the proposed solution convincing / technically sound
    - Strength of the proposed solution
    - Weakness of the work proposed solution
  - What could be done more to improve the technical aspect of the paper
  - Overall presentation quality of the paper
    - Clarity, write-up style, readability, references used etc.
A number of possible project topics (industry focused real world research issues) will be discussed

Students can choose one of these project ideas as the topic for their project

Although individual project will be allowed, it is recommended that the students form a group of four and do their project as a team (to promote and develop team work and collaboration effort)
Your project proposal should be 2-3 pages in length, and should include the followings:

- A specific problem statement
- Why it is important to address this problem
- How your proposed solution compares with the existing ones, if applicable
- An overview of your proposed idea to address the problem (i.e., how the proposed idea is expected to solve the problem)
- Gantt Chart / Project milestones indicating the timeline for completion of the individual components of your projects such as problem formulation, background study, outlining the solution, various stages of software development, simulation, final project delivery etc.

Your (a) project proposal report and (b) presentation will be 15% and 10% of your total grade, respectively.
Your research project proposal should be 2-3 pages in length, and should have the following components:

- A specific research problem statement
- Importance of the problem
- A brief discussion on the background or related work (what others have done so far)
- What is the proposed solution
- How the proposed solution compares with the exiting works. In other words, how the proposed solution will be better than others
- Brief discussion on the proposed solution
Research Project Proposal: Grad Research Paper (25%)

- **Research Components**
  - What types of analysis will be made (mathematical analysis, experimental results through simulation etc.)
  - What are the performance parameters / indicators / metrics to be used to measure the effectiveness of the proposed solution
  - *Gantt Chart / Project milestones* indicating the timeline for completing the final research paper. Items such as problem formulation, background study, proposed solution, analytical or experimental results through mathematical modeling or simulation, performance analysis etc.
  - Your (a) project proposal report and (b) presentation will be 15% and 10% of your total grade, respectively.
Final Project (45%)

- **Undergraduate students:**
  - Design & Development of a prototype (and a report of 8-10 pages which is basically an extension of their project proposal)
  - Final report, and project presentation / demo will be 25% and 20% of your total grade, respectively.

- **Grad Students:**
  - Full scale research paper of 10 to 15 pages in length
  - This final research paper should be an extension of their proposed research proposal.
  - This research paper should include: (a) problem statement; (b) relevant work, (c) technical / scientific contribution (d) detailed description of the proposed solution (e) validation through analysis
  - Final report, and research paper presentation will be 35% and 10% of your total grade, respectively
Undergrad Project Proposal Presentation (10%)

- Presentation duration: 20 mins, 5 mins Q&A
- Each group member should participate in the presentation
- 10% of your total grade

Undergrad Final Project Presentation / demo (20%)

- Presentation duration: 30 mins, 5 mins Q&A
- Each group member should participate in the presentation
- 20% of your total grade
Project Presentation

- **Grad Research Project Proposal Presentation (10%)**
  - Presentation duration: 20 mins, 5 mins Q&A
  - Each group member should participate in the presentation
  - 10% of your total grade

- **Grad Final Research Paper Presentation (10%)**
  - Presentation duration: 30 mins, 5 mins Q&A
  - Each group member should participate in the presentation
  - 10% of your total grade
Course Materials

- No required text books, but the following books are good for learning networking fundamentals:
  - Computer Networks by Andrew Tanenbaum
  - Computer Networking: A Top-Down Approach by James Kurose, Keith Ross

- Recommended readings will be available on course website (list of technical and research papers)

- Lecture notes will be available on course website prior to each class

- Other online resources will be available through course website as needed
Some links on effective presentation skills

- [www.virginia.edu/cue/presentationtips.html](http://www.virginia.edu/cue/presentationtips.html)
- [http://libguides.usc.edu/content.php?pid=83009&sid=891476](http://libguides.usc.edu/content.php?pid=83009&sid=891476)
THANK YOU!

Questions?