Faculty of Eng. & Natural Sci.

EE414-202001
Multimedia Communication

Instructor(s)

<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
<th>Office</th>
<th>Phone</th>
<th>Web</th>
<th>Office Hours</th>
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</thead>
<tbody>
<tr>
<td>Özgür Erçetin</td>
<td><a href="mailto:oercetin@sabanciuniv.edu">oercetin@sabanciuniv.edu</a></td>
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<td>Every Wednesday between 12-2pm, or by appointment.</td>
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Course Content


Objectives

To introduce students with communication networks and networking technologies, performance analysis of networks, multimedia traffic and networking.

Recommend or Required Reading

Textbook

James F. Kurose and Keith W. Ross, Computer Networking: A Top-Down Approach Featuring the Internet, Addison Wesley
https://www.homerbooks.com/urun/computer-networking-a-top-down-approach

Readings

Alberto Leon-Garcia, Indra Widjaja, Communication Networks, MCGraw Hill
Dimitri Berstekas, Robert Gallager, Data Networks, Prentice Hall
Assessment Methods and Criteria

<table>
<thead>
<tr>
<th>Assessment Method</th>
<th>Percentage (%)</th>
<th>Number of assessment methods</th>
</tr>
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<tbody>
<tr>
<td>Exam</td>
<td>70</td>
<td>7</td>
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<tr>
<td>Group Project</td>
<td>20</td>
<td></td>
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<tr>
<td>Homework</td>
<td>10</td>
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Course Outline

- **Introduction**
- Networking basics, Reference models, Layering concept
- **Application Layer**
- Principles of Network Applications, Web & HTTP, Electronic Mail, Peer-to-peer
- Applications
- Transport Layer
- Connectionless Transport (UDP), Principles of Reliable Data Transfer, Connection
- Oriented Transport (TCP), Principles of Congestion Control, TCP Congestion Control
- Network Layer: Data Plane
- What’s Inside A Router? The Internet Protocol, IPv4, IPv6
- Network Layer: Control Plane
- Routing Algorithms, Routing in the Internet, Software Defined Networks
- The Link Layer and Local Area Networks
- Error Detection Techniques, Multiple Access Protocols, Ethernet, WiFi: 802.11 LANs,
- Link Layer Switches
- Multimedia Networking
- Multimedia Applications, Protocols for Real-Time Services, Traffic Management
- Network Performance Analysis
- Traffic characterization, basic queueing models, examples from network queueing problems

Learning Outcomes

By the end of this course, students should be able to:
- Describe the operation of existing network technologies
- Construct applications or interfaces to work with existing network technologies
- Propose networking solutions at all layers
- Build models for analyzing network algorithms/protocols
- Build simulation models for analyzing the performance of network algorithms/protocols, architectures, deployments, etc.
- Use network simulation tools
- Record and interpret the results of simulation experiments
- Adopt a systematic approach to understand network problems
- Improve programming skills by building models in simulation tools
Improve team working skills via course project

**Course Policies**

The prerequisite is specified as CS201. Background in probability is a plus.

We will have bi-weekly single question (with several parts) multiple choice exam. In total there will be 7 exams during lecture hours. The duration of the exam will be 15-30 minutes depending on the difficulty of exam question.

There will be 2-3 programming assignments on Netsim simulation environment and Wireshark. The assignments can be completed as a group.

We will have bi-weekly homework assignments on the subject of the exam that will take place the subsequent week.