

CSCI 353 Introduction to Internetworking

Fall 2017 Syllabus

CSCI 353 is an undergraduate level course on computer networking. The goal is to teach the fundamental concepts and principles of networking, focusing particularly on how they apply to the Internet.

The topics include, but not limited to: internetworking principals, routing protocols, congestion control, TCP/IP, networked applications, network quality of service, mobile networking, multimedia, router architectures, network security, and performance issues.

Some issues considered in this class:

- How the global network infrastructure works and the underlying design principles
- The ways these design principles can be compromised in practice
- The ways we can improve it in the face of rapidly growing scale and heterogeneity

| Instructor | Email | Office | Office Hours | Lecture |
|----------------|-----------------|--------|--------------|-----------------------|
| Tatyana Ryutov | tryutov@usc.edu | TBD | TBD | MoWe 10:00-11:50am |

Required Textbook:

“Computer Networking: A Top-Down Approach,” by Jim Kurose and Keith Ross

Recommended:

“Computer Networks: A Systems Approach,” by Larry L. Peterson and Bruce S. Davie

“Computer Networks,” by Andrew S. Tanenbaum

“Computer Networks and Internets” by Douglas E. Comer

Paper:

E2E: “End-to-End Arguments in System Design” by Saltzer, Reed, and Clark, 1984

Course Website: <https://piazza.com/usc/fall2017/csci353>

Blackboard will be used for submitting assignments and posting of grades

Piazza will be used for lectures, announcements, assignments, and intra-class communication

Grading:

| Artifact | Weight | Date |
|----------|--------|---------|
| Quizzes | 20% | various |
| Midterm | 20% | TBD |

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| Final Exam | 30% | December 11 |
| Programming Projects | 30% | various |

Projected Schedule

Class sequence, dates, reading assignments, and topics are subject to change as the semester proceeds. Any revisions will be noted and announced in class.

| Week | Mo/We | Topic | Reading | Other |
|------|----------------|--|--|-------|
| 1 | 8/21 8/23 | 1. Introduction 2. Internet history, network access technologies | Chapter 1.1, Chapters 1.7,1.2 | |
| 2 | 8/28 8/30 | 3. Core concepts 4. Concepts and layering | Chapter 1.3 Chapters 1.4, 1.5 | |
| 3 | 9/4 9/6 | No class - USC holiday 5. Internet design goals and principles, socket programming | E2E paper Chapter 2.7 | |
| 4 | 9/11 9/13 | 6. Application layer 7. Networked applications: HTTP, FTP, email | Chapter 2.1 Chapters 2.2-2.4 | |
| 5 | 9/18 9/20 | 8. Networked applications: DNS, P2P 9. Transport layer | Chapter 2.5, 2.6.1 Chapter 3.1-3.4 | |
| 6 | 9/25 9/27 | 10. TCP protocol 11. TCP: retransmission and congestion control | Chapters 3.5.1-3.5.4 Chapters 3.5.5, 3.5.6, 3.6, 3.7 | |
| 7 | 10/2 10/4 | 12. The network layer 13. The Internet protocol | Chapters 4.1-4.3 Chapter 4.4 | |
| 8 | 10/9 10/11 | 14. Internetworking: routing algorithms 15. Routing, midterm review | Chapter 4.5.1, 4.5.2 Chapter 4.5.3 | |
| 9 | 10/16 10/18 | Midterm (tentatively) 16. Routing: broadcast and multicast | Chapter 4.7 | |
| 10 | 10/23 10/25 | 17. BGP and Internetworking 18. Getting Connected with QoS | Chapter 4.6.3 Chapters 7.5.2-7.5.4 | |
| 11 | 10/30 11/1 | 19. The link layer 20. Ethernet | Chapters 5.1-5.3 Chapters 5.4.2, 5.4.3 | |
| 12 | 11/6 11/8 | 21. LAN, virtualization, datacenter networking 22. Wireless | Chapters 5.4-5.6 Chapters 6.1-6.4 | |
| 13 | 11/13 | 23. Mobility | Chapter 6.5-6.8 | |

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| | 11/15 | 24. Multimedia | Chapters 7.1, 7.2 | |
| 14 | 11/20 11/22 | 25. Multimedia 26. Network security | Chapters 7.3, 7.4 Chapters 8.1-8.4 | |
| 15 | 11/27 11/29 | 27. Network security 28. Final exam review | Chapters 8.5-8.9 | |

Academic Conduct

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Section 11, Behavior Violating University Standards <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions>. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the Office of Equity and Diversity <http://equity.usc.edu> or to the Department of Public Safety <http://adminopsnet.usc.edu/department/department-public-safety>. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. The Center for Women and Men <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage <http://sarc.usc.edu> describes reporting options and other resources.

Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the American Language Institute <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. The Office of Disability Services and Programs http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, USC Emergency Information <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to

me as early in the semester as possible. Your letter must be specific as to the nature of any accommodations granted. DSP is located in STU 301 and is open 8:30 am to 5:30 pm, Monday through Friday. The telephone number for DSP is (213) 740-0776.