**Course Number and Title: CS 5450: Networked and Distributed Systems**

**Instructor:** Vitaly Shmatikov

**Credits:** 3 hours, Letter Grade

**Time and Location:** Tuesday/Thursday 11:40a - 12:55p. Bloomberg Center, Room 131

**Course Description:**

This course introduces students to the design and implementation of networked and distributed systems. Topics include the basics of networking (including Internet architecture, TCP/IP, Wi-Fi, and routing), distributed protocols, foundations of cloud computing, reliability, fault tolerance, and security in distributed systems, and introduction to performance evaluation. Course labs and projects include a significant implementation component and require working knowledge of C/C++.

**Prerequisites:**

Undergraduate coursework in operating systems and networks, working knowledge of C/C++.

**Required Materials:**

Selected course notes will be distributed as needed.

**Assignments, Exams and Projects:**

| **Activity** | **Overview** | **Point Values** |
|---|---|---|
| Project #1 | Implementation lab | 15% |
| Midterm | In class, pen and paper | 10% |
| Project #2 | Implementation lab | 15% |
| Project #3 | Implementation lab | 15% |
| Project #4 | Implementation lab | 15% |
| Final exam | Take-home | 20% |
| Attendance and participation | | 10% |
| Total Points | | 100% |

**Course Outcomes:**

1. Demonstrate fundamental understanding of core problems, concepts, and techniques in networked and distributed systems.
2. Understand the design principles of distributed systems used in industry.
3. Gain experience implementing and evaluating key technologies underlying modern distributed systems.

**Sample topics:**

- Core networking protocols (Ethernet, 802.11, IP, TCP, BGP, DNS)
- Peer-to-peer systems and content distribution networks
- MapReduce and Spark
- Consensus protocols
- Distributed storage systems (e.g., Dynamo, GFS, BigTable, Spanner)
- Scalable machine learning systems

**Academic Integrity:**
Each student in this course must abide by the Cornell University Code of Academic Integrity, which can be found here:

https://theuniversityfaculty.cornell.edu/academic-integrity/

Any work submitted by a student for academic credit will be the student's own work (teams can submit joint work for an assignment that explicitly permits team submissions). Students are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. This permissible cooperation, however, should never involve one student possessing a copy of all or part of work done by someone else. If the Code is violated, all students who participated in the violation (e.g., both the student who copied work from another student and the student who gave material to be copied) will be subject to grade penalties and, depending on the severity of the violation, failing grade in the course and University disciplinary action.

During examinations, each student must do their own work. Talking or discussion is not permitted during the examinations. Students may not compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in a failing grade for the exam or the entire course, as well as possible University disciplinary action.

**Students with Disabilities:**

Your access to this course is important. Please provide your Student Disability Services (SDS) accommodation letter early in the semester so that we have adequate time to arrange your approved academic accommodations. If the need arises for additional accommodations during the semester, please contact SDS. You may also speak with Student & Academic Affairs at Cornell Tech who will connect you with the university SDS office.