

Title: CS 6/75995 Foundations of Peer-to-Peer Computing

Fall 2012, Department of Computer Science
Kent State University

Introduction: Welcome to the course foundation of peer-to-peer computing scheduled for Fall 2012. In this course we study and learn about the design of the latest in cyber systems. Various cyber community computing systems such as peer-to-peer computing, crowdsourcing has quite conspicuously emerged as one of the most innovation rich areas in computer networking. It is perhaps the most significant development in computing since the web. Though it emerged as bold new service of the internet, but is gradually finding its base in rich formal foundation of distributed hashing, self-organization, complex networking, social science and graph theories. It has also become a breeding ground of technical innovations. This course will introduce architectures based on the formal foundation of theory of complex networks, distributed hashing and social engineering at advanced graduate level.

Intended Students: The course will be research intensive. Will require you to study technical papers and produce a creative project/paper. Limit 15 students. Advanced undergrad can enroll into the class with project track.

Topics:

Architectures

- Gnutella
- Bit-Torrent
- Chord, CAN, Pastry
- TOR

Theory

- Internet and web networks
- Distributed hashing
- Routing
- Networked search
- Self-organization and neighborhood optimization
- Fault tolerance, stability, churning

Social Engineering

- Trust propagation in network
- Cooperation and Competition
- Incentive and Crowd Sourcing

P2P Overlay Networks

- Overlays for publish/subscribe & event routing
- Overlays for multicast
- Overlays for multimedia and streaming overlays

Case Studies: Applications & Systems

- News Syndication
- Multimedia streaming, Distribution.
- Mechanical Turk
- BitCoin
- Wikipedia

Project

- A two stage project where you will build a bit-torrent client.
- Advanced students might be able to build various optimized systems in second phase.

Reference & Text:

- Class Notes & Research Papers
- **Volume 31, Issue 2, Pages 187-418 (5 February 2008), Special Issue: Foundation of Peer-to-Peer Computing**
Edited by Javed I. Khan and Adam Wierzbicki
- **Volume 31, Issue 3, Pages 419-654 (25 February 2008), Special Issue: Disruptive networking with peer-to-peer systems**, Edited by Javed I. Khan and Adam Wierzbicki.
- Papers from IEEE P2P.

Website:

<http://cs.kent.edu/~javed/class-P2P12F/>

Grading:

Type	Frequency	Weight
Assignments	3	20%
Critical Review/ Presentation	1-2	20%
Creative Project or Research Survey	1	20%
Midterm Exam	1	20%
Final Exam	1	20%

STUDENTS WITH DISABILITIES: University policy 3342-3-18 requires that students with disabilities be provided reasonable accommodations to ensure their equal access to course content. If you have a documented disability and require accommodations, please contact the instructor at the beginning of the semester to make arrangements for necessary classroom adjustments. Contact Student Disability Services (contact 330-672-3391) or visit www.kent.edu/sds for more information on registration procedures.

ACADEMIC DISHONESTY: You are expected to follow academic honor code in the course. See <http://iimagine.kent.edu/policyreg> and search on Policy #3342-3-18. Any dishonesty will be dealt strictly as per the policy without exception.