Course syllabus, schedule, lecture notes available online at
http://iqua.ece.toronto.edu/~bli/ece1771f

Grades and announcements
http://q.utoronto.ca
Episode 1. Introduction to the course

Baochun Li
Department of Electrical and Computer Engineering
University of Toronto
A brief self introduction
My academic history at a glance

M.S., Ph.D. Computer Science, Univ of Illinois, 1995 — 2000

Current: Professor, Computer Engineering Group, since 2000

Leads: iQua research group

Published: quite a few papers

Honours and awards: IEEE Fellow, class of 2015

14: PhD students who become faculty members

Working on: Cloud computing, mobile applications, security, multimedia systems, applications of network coding
Courses I have taught

Distributed Systems, senior undergraduate course (2000-2006)

Operating Systems, senior undergraduate course (since Winter 2008)

Computer Fundamentals, first year undergraduate course (since 2001)

Quality of Service, graduate course (since 2001)
Research vision

Bring theory to the realm of practical and realistic systems

In my PhD years: control theory
In papers of my past with students: game and optimization theory, network coding theory, economic markets

Build actual working systems, rather than simulations

1998 – 2000: distributed visual tracking
2002 – 2004: an overlay development framework
2005 – 2009: working systems of network coding
2010 – : cloud computing
Focus of my research

Raw network performance

Higher and sustainable throughput when downloading files
Lower latency (if possible)

Application-specific performance metrics

Fewer skips in playback when streaming multimedia
Shorter start-up delays when switching channels

Scalability of the entire system design

Resilience to loss, failures, and mobility
For more information

google my name
Objective of this course
To prepare students towards writing good papers in areas related to networking, cloud computing, and distributed systems research
Three concurrent tracks:
course lectures, self-motivated reading, critiques + course paper
Required Textbooks


   Available online — do a Google search for it


   Not available online

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As of September 13, 2018
Required Textbooks


a preprint is available online
A collection of fundamental design principles related to basic networking concepts

Basic properties of networks
The layering principle
The link, network and end-to-end layers
Flow and congestion control
Recent research: software defined networking and datacenter networks
Part II. “Fairness”

A detailed view of scheduling disciplines in a network switch, so that Quality of Service (QoS) can be achieved

Quality of Service is concerned with the “peace of mind” that resources are set aside to guarantee a particular level of performance

...even with competition from other network flows sharing the same pool of resources

We will also be studying recent advances in allocating resources in datacenters
Part III. “Dynamics”

We switch to a macroscopic, rather than a microscopic, view of large-scale networks.

We study dynamics, evolution, and resource allocation in these networks from a game-theoretic and an economic market point of view.

We then progress to matching markets, sponsored search markets, web search, and MapReduce.
Course assignments
Two deliverables in the course paper

Two deliverables of the course paper

Midterm paper draft (due October 26) (18%): 4 pages
Final paper (due December 20) (30%): 10 pages (builds on the previous deliverable)
IEEE Transactions LaTeX template, 11 point font in Times

Final examination (35%): December 19, 2018, Wednesday, 12 – 2 p.m.
Six weekly critiques (18%)

Read one designated paper in the week when it is assigned, starting September 27

Critique message to be sent to me by email, by the deadline (a Thursday 23:59) required on the course website

The email does not need to be long, just a few paragraphs would be good enough

The writing does not have to be formal, but needs to reflect your candid thoughts about the paper
Important dates and grading

Six critiques (Thursdays): 18% (3% each)
Midterm paper draft (17%): October 25, 2018, 11:59 p.m.
Final paper (30%): December 20, 2018, 11:59 p.m.
Final exam (35%): December 19, 2018, 12-2pm
Questions