# Advanced Computer Networks

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## 1. Goals

The area of computer networks is exhibiting an extremely *rapid* growth, which has been impacted by both technology and application domains. Teaching computer networks is an interesting challenge for the instructor because *the field is in constant flux*. "*What then should be taught to prepare students for what lies ahead?*" "*What information will remain important over the technical career of a student, and what information will soon become obsolete, of historical interest only?*" This course stresses *the design ideas* embodied in many networks and the *techniques* for evaluating these ideas. The ideas and the evaluation techniques are the principles that will survive.

This course is intended to give students deep, broad, and up-to-date knowledge in the area of computer networks. Topics are selected to reflect current trends and interests. Each one is treated from both *theoretical* and *practical* points of view. The course concentrates on fundamental concepts and design issues of QoS (e.g., resource management, traffic control and integrated services network), wireless communications and mobile Internet technologies. Important applications will be used as examples to illustrate the important design and management issues in the future communication networks.

## 2. Topics Internet – Wired and Wireless – QoS and Mobility

**(1)** Resource Management and Traffic Control (leaky bucket, admission control, scheduling)

**(2)** Quality of Service QoS - Integrated Services, Differentiated Services, RSVP resource reservation protocol

**(3)** Wireless networks (wireless communications: interference model, access control, spectrum management/sharing, WiMAX, HSPDA, LTE, femtocell)

**(4)** Mobile IP and Mobility Management

## 3. References

- James F. Kurose and Keith W. Ross, "Computer Networking: A Top-Down Approach," Addison Wesley, $5^{th}$ edition 2009.
- S. Tanenbaum, "Computer Networks," $3^{rd}$ edition, Prentice Hall, 1996.
- Andrew S. Tanenbaum and David J. Wetherall, "Computer Networks," $5^{th}$ edition, Prentice Hall, 2010.
- Paper readings

## 4. Grading

- Homework (8%)
- Midterm (32%)
- Paper Survey Report (10%) (due on 6/10/2011)

## 5. Important Dates

- Seven lectures - 2/21, (2/28 放假), 3/7, 3/14, 3/21, 3/28, (4/4 放假), 4/11
- Midterm: 4/18 2:20pm-5:20pm