ELEC 8002   Advanced Topics in Networking
Second Semester 2019

Instructor:	Dr. Ka-Cheong Leung
Lectures:	Thursdays 14:30 - 17:20, K 113
Prerequisite:	Elementary course on computer networks
Reference Text:	*Computer Networking: A Top-Down Approach*, J. F. Kurose and K. W. Ross, Sixth Edition, Pearson, 2013.
Required Readings:	Please refer to the "References" section
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Class Web Site:	http://www.eee.hku.hk/~kcleung/courses/elec8002/Second.2019

Course Description

Summary: The course aims to focus on gaining knowledge of advanced, cutting-edge research and development in the protocol design for networking, learning to write critical reviews of research papers, and exploring a research project in some depth. Topics include general background about networking, design principles for the Internet, transport layer protocols, queue management, and network architecture.

Grading Scheme:	Reading Reports	30%
	Research Paper and Presentation	70%

It is highly advised that you acquire a copy of the required readings for the class. Class notes are generally available from the class web site 1-2 days before the scheduled session of each lecture. Supplementary reading materials will also be posted to the class web site.

You are expected to attend every lecture session. If you do happen to miss a session, you are responsible for finding out what material was covered and if any administrative announcements were made.

Under normal circumstances, all coursework is submitted by the respective due schedules. Under normal circumstances, *no* extension will be granted. *No late coursework will be accepted for credit.*

All of your work submitted for credit *must* be done on your own. Work or ideas developed by someone else *must* be properly cited in your coursework, or it is considered plagiarism. When scholastic dishonesty is suspected, the case will be reported to the University Disciplinary Committee. *Strict adherence to this Academic Integrity Policy is expected.*

Tentative Schedule:[1]

Date	Topics/Events	Assigned Readings
17 January 2019	Design Principles I	[1], [2], [3], [4]
24 January 2019	Design Principles II	[5], [6]
31 January 2019	Transport Layer Protocols I	[7], [8]
14 February 2019	Transport Layer Protocols II	[9]
21 February 2019	Transport Layer Protocols III	[10] [11]
28 February 2019	Transport Layer Protocols IV	[12], [13]
14 March 2019	Reading Report 1 Due	N/A
14 March 2019	Research Paper Proposal Due	N/A
14 March 2019	Queue Management I	[14]
21 March 2019	Queue Management II	[15]
28 March 2019	Queue Management III	[16]
4 April 2019	Network Architecture I	[17]
11 April 2019	Network Architecture II	[18], [19]
18 April 2019	Network Architecture III	[20], [21]
25 April 2019	Reading Report 2 Due	N/A
25 April 2019	Research Paper Presentation	N/A
3 May 2019	Research Paper Due	N/A

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[1]This schedule will be adjusted as the semester progresses. It is the students' responsibility to keep apprised of any changes.

References

[1] J. F. Kurose and K. W. Ross. *Computer Networking: A Top-Down Approach.* Sixth Edition. Pearson, 2013.

[2] M. J. Hanson and D. J. McNamee. *Efficient Reading of Papers in Science and Technology.* Brochure, 6 January 2000.

[3] V. O. K. Li. Hints on Writing Technical Papers and Making Presentations. *IEEE Transactions on Education*, Vol. 42, No. 2, pp. 134-137, May 1999.

[4] D. D. Clark. The Design Philosophy of the DARPA Internet Protocols. *ACM SIGCOMM Computer Communication Review*, Vol. 25, No. 1, pp. 102-111, January 1995.

[5] M. S. Blumenthal and D. D. Clark. Rethinking the Design of the Internet: The End-to-End Arguments vs. the Brave New World. *ACM Transactions on Internet Technology*, Vol. 1, No. 1, pp. 70-109, August 2001.

[6] D. D. Clark, J. Wroclawski, K. R. Sollins, and R. Braden. Tussle in Cyberspace: Defining Tomorrow's Internet. *IEEE/ACM Transactions on Networking*, Vol. 13, No. 3, pp. 462-475, June 2005.

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[8] J. Padhye, V. Firoiu, D. F. Towsley, and J. F. Kurose. Modeling TCP Reno Performance: A Simple Model and Its Empirical Validation. *IEEE/ACM Transactions on Networking*, Vol. 8, No. 2, pp. 133-145, April 2000.

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[10] K.-C. Leung, V. O. K. Li, and D. Yang. An Overview of Packet Reordering in Transmission Control Protocol (TCP): Problems, Solutions, and Challenges. *IEEE Transactions on Parallel and Distributed Systems*, Vol. 18, No. 4, pp. 522-535, April 2007.

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[12] D. Katabi, M. Handley, and C. Rohrs. Congestion Control for High Bandwidth-Delay Product Networks. *ACM SIGCOMM Computer Communication Review*, Vol. 32, No. 4, pp. 89-102, October 2002.

[13] Q. Peng, A. Walid, J. Hwang, and S. H. Low. Multipath TCP: Analysis, Design, and Implementation. *IEEE/ACM Transactions on Networking*, Vol. 24, No. 1, pp. 596-609, February 2016.

[14] A. K. Parekh and R. G. Gallager. A Generalized Processor Sharing Approach to Flow Control in Integrated Services Networks: The Single-Node Case. *IEEE/ACM Transactions on Networking*, Vol. 1, No. 3, pp. 344-357, June 1993.

[15] K. Nichols and V. Jacobson. Controlling Queue Delay. *ACM Queue*, Vol. 10, No. 5, May 2012.

[16] C. Lai, S. H. Low, K.-C. Leung, and V. O. K. Li. Pricing Link by Time. *ACM SIGMET-RICS Performance Evaluation Review*, Vol. 42, No. 1, pp. 421-433, June 2014.

[17] A. Greenberg, J. R. Hamilton, N. Jain, S. Kandula, C. Kim, P. Lahiri, D. A. Maltz, P. Patel, and S. Sengupta. VL2: A Scalable and Flexible Data Center Network. *ACM SIGCOMM Computer Communication Review*, Vol. 39, No. 4, pp. 51-62, October 2009.

[18] N. McKeown, T. Anderson, H. Balakrishnan, G. Parulkar, L. Peterson, J. Rexford, S. Shenker, and J. Turner. OpenFlow: Enabling Innovation in Campus Networks. *ACM SIGCOMM Computer Communication Review*, Vol. 38, No. 2, pp. 69-74, April 2008.

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