ESE # 550 Title Network Management & Planning

Fall 2011 Semester

Course Designation: Elective

ESE	550	Network Management & Planning	TH	6:50 PM	9:50 PM	EARTH&SPACE	183

Text Books: **Routing, Flow, and Capacity Design in Communication and Computer Networks**

Data Center Infrastructure Design Guide 2.5
<http://www.cisco.com/univercd/cc/td/doc/solution/dcidg21.pdf>

DATA CENTER LAN CONNECTIVITY DESIGN GUIDE
www.juniper.net/us/en/local/pdf/**design-guide**s/8020010-en.pdf

Describes proven Cisco and Juniper solutions for providing architecture designs in the enterprise data center.

Prerequisites: Any Computer Network Class. Some background in calculus and linear algebra

Instructor: **Dantong Yu**

Goals: **To present basic principals and methods for developing optimization models for contemporary communication and computer network design and planning. The areas to be covered: traffic routing, flow and resource capacity optimization, and LAN and data center networks.**

Objectives: **To give students a strong background in cost-optimization, network management and planning.**

Class Schedule: **6:50PM-9:50PM, Thursday**

Office Hour: **6:00PM-6:50PM, Thursday**

Office Hour Location: **Light Engineer, 249**

Topics Covered:

Week 1, Sep/01.	Network Planning Problem and Analytical Aspects of Network Planning
Week 2 Sep/08	Basic notions and concepts of network modeling and design Multi-commodity flow network notation (chapter 2)
Week 3 Sep/15	Multi-commodity flow network application in IP, MPLS, SONET/SDH, WDM, and IP over SONET General multi-commodity flow network models (Chapter 3, 4)
Week 4 Sep/22	Network Design Example and Chapter 4 Network Design
Week 5 Sep/29	Rosh Hashanah (Observed) **NO CLASSES IN-SESSION**
Week 6 Oct/06	Linear Programming for Network Design
Week 7 Oct/13.	Chapter 6: Location and Topological Design
Week 8 Oct/20	Mid-term Exam
Week 9 Oct/27	Chapter 7 Shortest Path Routing
Week 10 Nov/3.	Chapter 8: Fair Network Design
Week 11 Nov/10.	Chapter 9: Resilient Network Design (with Restoration and Protection) and Open Notes)
Week 12 Nov/17	Cisco & Juniper Data Center Network Design
Week 12 Nov/22	Paper Review
Week 13 Dec/01.	Paper Review
Week 14 Dec/08	Paper Review
Week 15 Dec/15	Final Exam Week (Open Book and Open Notes)

Grading:

10% of Participation
50% of grade for mid-term and final Exams/quizzes
20% of grade for Paper Presentation
20% of grade for Paper Summary

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Prepare Date: **5/31/11**

Paper Lists: (More Papers can be added as needed)

Better Never than Late: Meeting Deadlines in Datacenter Networks, Christopher Wilson (UCSB); Hitesh Ballani, Thomas Karagiannis, Ant Rowstron (Microsoft Research), Sigcomm 2011

DevoFlow: Scaling Flow Management for High-Performance Networks, Andrew R. Curtis (University of Waterloo); Jeffrey C. Mogul, Jean Tourrilhes, Praveen Yalagandula, Puneet Sharma, Sujata Banerjee (HP Labs)

Improving Datacenter Performance and Robustness with Multipath TCP, Costin Raiciu (University College London & University Politehnica Bucharest); Sebastien Barre (Université Catholique Louvain); Christopher Pluntke, Adam Greenhalgh, Damon Wischik, Mark Handley (University College London)

NetLord: A Scalable Multi-Tenant Network Architecture for Virtualized Datacenters, Jayaram Mudigonda, Praveen Yalagandula, Jeffrey C. Mogul (HP Labs); Bryan Stiekes, Yanick Pouffary (HP)

The Power of Prediction: Cloud Bandwidth and Cost Reduction, Eyal Zohar, Israel Cidon (Technion); Osnat Mokryn (Tel Aviv College)

Towards Predictable Datacenter Networks, Hitesh Ballani, Paolo Costa, Thomas Karagiannis, Ant Rowstron (Microsoft Research)

Sharing the Data Center Network
Alan Shieh, *Microsoft Research and Cornell University;* Srikanth Kandula, *Microsoft Research;* Albert Greenberg and Changhoon Kim, *Windows Azure;* Bikas Saha, *Microsoft Bing*

ServerSwitch: A Programmable and High Performance Platform for Data Center Networks Guohan Lu, Chuanxiong Guo, Yulong Li, Zhiqiang Zhou, Tong Yuan, Haitao Wu, Yongqiang Xiong, Rui Gao, and Yongguang Zhang, *Microsoft Research Asia*