#### CS 5229 ADVANCED COMPUTER NETWORKS

Dr. Chan Mun Choon School of Computing National University of Singapore

#### About the course

- Main website:
  - http://blog.nus.edu.sg/cs5229
- IVLE: CS5229
  - Additional reference papers, discussion forums, grades

#### About me

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## **Course Description**

- Introduce graduate students to fundamental networking problems and concepts
  - For students interested in the area of networking, this course will be rewarding
- Long homework
- Midterm + Finals

# (Tentative) Outline/Schedule

- 1 12/8 Internet Architecture
- 2 19/8 Traffic Engineering
- 3 26/8 Traffic Engineering
- 4 2/9 Congestion Control
- 5 9/9 Congestion Control
- 6 16/9 Midterm
- 7 30/09 Scheduling/Buffer Management
- 8 07/10 Scheduling/Buffer Management
- 9 14/10 Routing
- 10 21/10 Internet Topology
- 11 28/10 Mobility
- 12 04/11 Wireless
- 13 11/11 Review

# (Tentative) Grading Policy

- Homework
  40% (3 Assignments)
- Mid-Term Exam 20%
- Final Exam 40%

## Readings

- No textbook, 2-3 research papers will be assigned for reading each week
- You should read the papers assigned
- Slides are meant to be brief

## slides != notes

#### References

- Need a refresher?
  - Computer Networking, 5/e. James F. *Kurose* Keith W. *Ross*. ISBN: 0-13-607967-9.
- Others
  - S. Keshav, "An Engineering Approach to Computer Networking", Addison-Wesley.
  - Bertsekas and Gallager, "Data Networks", 2nd Edition, Prentice Hall

#### **Course Pre-requisites**

- Assume students have taken undergraduate networking classes like CS2105/CS3103
- Basic background on probability and algorithms
- Know how to program in C or C++ or is comfortable in picking up a new programming language

## You should already know...

- Router, switches, ISP, AS
- IP addressing, DNS, DHCP
- protocol stacks, layering, multiplexing
- MAC, CSMA/CA, Ethernet
- Routing, shortest-path, spanning tree
- transport protocols, TCP vs. UDP, congestion control
- FTP, HTTP

# Assignment 1

- Problem solving (materials from weeks 1 to 5)
  - Questions will be given at the end of each lesson (weeks 1 to 5),
  - 2. Submit at start of class at week 6 (before midterm)

## Assignments 2 & 3

- Assignment 2 will involve programming, e.g.
  - Design, implement, and compare different scheduling algorithms
  - Design, implement and compare different "centralized" routing algorithms
- Assignment 3
  - Write a survey paper
  - Can be done in groups