

The slide features four decorative corner elements, each consisting of a small black square with a quarter-circle cutout, positioned at the top-left, top-right, bottom-left, and bottom-right corners of the slide.

CS5229

Advanced Computer Networks

Ooi Wei Tsang

ooiwt@comp.nus.edu.sg

AS6, 05-14

Fundamental principles/techniques of computer networking

Through reading
classic/influential
papers

Philosophy

Students are expected to be: Mature,
Independent, Resourceful

What you learned is more important
than your grade.

Please don't ask..

“Should I memory this equation?”

“Do I have to memorize this header format?”

“Post model answer to X”

Academic Honesty

No copying among students

No copying from published work

ZERO tolerance to plagiarism.

Please do ask ..

“What is the effect of changing k in the equation?”

“Why did the designer added this bit in the header?”

Discussion?

Strongly encouraged (when permitted)

But ..

must acknowledge all contributions

write up solution independently

Continuous Assessment

35% Final exam (open book)

40% Two programming assignments

25% Midterm (open book)

Other Related Courses

CS4222: Wireless Computing and Sensor Networks

CS4274: Mobile and Multimedia Networking

CS5321: Network Security and Management

CS6204: Advanced Topics in Networking

MA6251: Modeling for Computer Network
Performance

EE5913, 6302, 6401, 6902 etc.

You won't see much..

wireless networks
sensor networks
mobile networks
network security

Reading Materials

No textbook for this class. Materials comes from research papers online.



CS5229

ADVANCED COMPUTER NETWORKS

http://ivle.nus.edu.sg – IVLE Module Outline

CLOSE



Created: 11-Jul-2007, Updated: 02-Aug-2007

Module

Description

Text & References

Class Roster

Guest Roster

Class Groups

Timetable

Announcement

Assessment

Discussion Forum

Module Code	CS5229		
Module Title	ADVANCED COMPUTER NETWORKS		
Semester	Semester 1, 2007/2008		
Modular Credits	4		
Faculty	School of Computing		
Department	Computer Science		
Teaching Staff	DR OOI WEI TSANG	dcsooiwt@nus.edu.sg	Lecturer
Weblinks	http://www.comp.nus.edu.sg/~ooiwt/cs5229 The MAIN course website	Teaching Website	★★★★
Module Blog	--		

Aims & Objectives | Prerequisites

AIMS & OBJECTIVES

Top

This course covers advanced fundamental principles of computer networks and techniques for networking. The goal of this course is to teach these fundamentals/techniques that will remain important and relevant regardless of the hot topics in networks and networking. Briefly, the topics include advanced network architecture and design principles, protocol mechanisms, implementation principles and software engineering practices, network algorithmic, network simulation techniques and tools, performance analysis and measurement, and protocol specification/verification techniques.

PREREQUISITES

Top

CS2105 or equivalent introductory computer networking modules.

Aims & Objectives | Prerequisites

Close

Read i.lxnp.com

ABP



CS5229 : ADVANCED COMPUTER NETWORKS

SEMESTER 1, 2007/08

About
Calendar
Reading List
Assignments

LECTURE 1: DESIGN PRINCIPLES OF THE INTERNET

- D. D. Clark. "The Design Philosophy of the DARPA Internet Protocols," in the Proceedings of ACM SIGCOMM '88, August, 1988. [CiteSeer](#)
- J. H. Saltzer, D. P. Reed, and D. D. Clark. "End-to-end arguments in system design," ACM Transactions on Computer Systems, pages 277--288, 1984. [CiteSeer](#)

ABOUT CS5229

- **Who:** Ooi Wei Tsang (ooiwt)
- **Where:** Building COM1, Room 204
- **When:** Fri 1830-2030
- **Workload:** Lecture (2hr) Preparation (6hr) Homework (2hr) per week
- **CA:** Open Book Exam (35%) Assignments (40%) Quizzes/Midterm (25%)
- **Objective:** This course covers advanced fundamental principles of computer networks and techniques for networking. The goal of this course is to teach these fundamentals/techniques that will remain important and relevant regardless of the hot topics in networks and networking. Briefly, the topics include advanced network architecture and design principles, protocol mechanisms, implementation principles and software engineering practices, network algorithmic, network simulation techniques and tools, performance analysis and measurement, and protocol specification/verification techniques.

TENTATIVE SYLLABUS

- Design principles (End-to-End Arguments, Layering)

Assumed Background

Undergraduate-level Networking

(CS2105/CS3103 or equivalent)

Internet Architecture

You know what the following terms mean: router, switches, ISP, AS.

You know how Internet is different from a Telephony network.

Internet Architecture

You frown when someone equates
the Internet with the Web

Naming/Addressing

You know what is a domain name, what is an IP address, and how to map between the two.

You know how DHCP assigns a dynamic IP address to you host.

Protocol Layers

You know the functionalities of 5 layers of the Internet protocol stack.

Application Protocol

You roughly know how HTTP and
FTP works.

Transport Protocol

You know what is a port and socket

You can tell the differences between TCP and UDP. You know in what situation you should use which.

TCP

You know why congestion control and flow control are needed. You roughly know how TCP's congestion control works.

Network Layer

You know that almost everything runs on IP. You know how packets are routed on the Internet, at least within an AS.

Network Layer

You know what's a private IP address and why NAT makes P2P file sharing difficult.

Ethernet

You know why Ethernet is a random access protocol. You know what collision and backoff mean in this context.

Ethernet

When people talked about “MAC address” you didn’t think it’s related to location of nearest McDonald.

You know how mapping between MAC and IP addresses is done.

Tools

You have used ping or traceroute.
Or at least heard about them and
know what they are for.

Basic Probability

You know what is expected value, variance, random variable, and cumulative distribution function.

You know how to compute conditional probability and probability of two events.

Programming

You know how to program in C or C++, and is comfortable in picking up new languages.