

# Computer Networks and Applications

COMP 3331/COMP 9331

LIC: Nadeem Ahmed  
[nadeem.ahmed@unsw.edu.au](mailto:nadeem.ahmed@unsw.edu.au)

## Course Outline & Logistics

# Today's Agenda

- Course (non-technical) details
- Logistics: How we will roll
- What is this course about?
- Introduction to Computer Networks (Chapter 1)

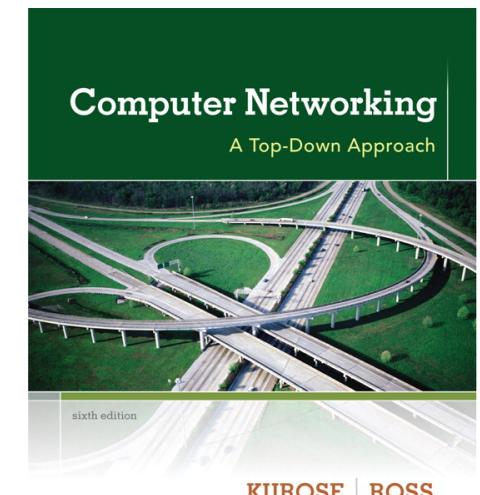
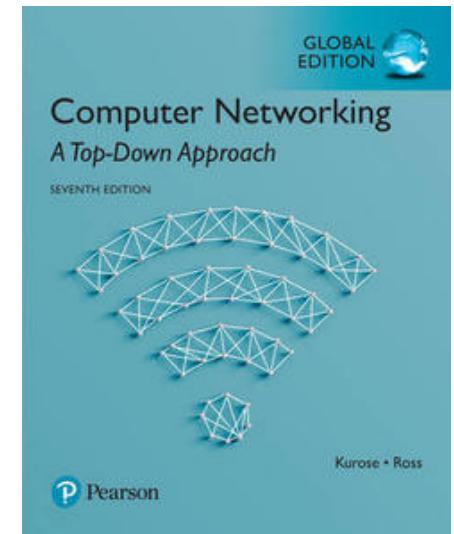
# WebCMS Portal

- <https://webcms3.cse.unsw.edu.au/COMP3331/18s2/>
- Everything is posted on the course website
  - **Course Outline (PLEASE READ THIS THOROUGHLY)**
  - Lecture Notes
  - Video Recordings
  - Lab Schedules, Allocations and Locations
  - Assignment and Lab Exercises
  - Homework Problems
  - Consultation hours
  - **Announcement:** Your responsibility to check the announcement forum on regular basis for important updates/changes to schedule, etc.
  - Nothing will be handed out in the class
  - **Your active participation and interaction is crucial to ensure that all of us get the most out of this course**

Very  
important

# Course Material

- *Computer Networking: A Top Down Approach*, Jim Kurose, Keith Ross, Addison-Wesley(Pearson), 7<sup>th</sup> Edition, 2016 (6<sup>th</sup> Edition will suffice for most of the part).
- Lecture Notes (on WebCMS)
- Links/articles on additional material
- Reference Books:
  - *Computer Networks: A Systems Approach*, Larry Peterson and Bruce Davie, Morgan Kaufmann, Fourth Edition, 2007.
  - *Unix Network Programming Volume 1 - Networking APIs: Sockets and XTI*, W. Richard Stevens, Prentice Hall, Second Edition, 1998 (Third edition also available)
  - *Java Network Programming*, E. R. Harold, O'Reilly, Third Edition, 2004.
- Links to programming help



# Course Aims

- To gain in-depth introduction to a wide range of topics in the field of computer networks, including the Internet
- To obtain hands-on understanding of networking protocols
- To gain skills in network programming, designing and implementing network protocols, evaluating network performance and problem solving
- To build necessary foundational knowledge required in more advanced networking courses
  - You will gain problem solving skills

# Teaching/Learning Strategies

- Lectures (12 weeks, 3-hr per week)
- Labs (7 of them)
  - Hands-on learning
- Assignments (only 1, but individual, due Week 12)
  - Basic network programming and protocol design
  - C or Java or Python
- Weekly Homework (Self-assessed)
  - Problem solving skills

# Lectures

- Lectures (12 weeks, 3-hr per week)
- We will focus on most important concepts and supplement with
  - Problem solving exercises
  - Discussions
  - Additional material
- Certain material will be left for self study
  - These will be indicated on the lecture notes

# Labs

- 2 hour lab sessions starting **Week 2**
- Hands-on experiments related to concepts that you learn in lectures
  - Wireshark packet sniffer, ns-2 network simulator, other network measurement tools
- 9 lab sessions:
  - 7 Lab Exercises:
    - Some are *submission* only, other requires *demonstration*
    - 5 best performing labs out of 7 will be used for assessment
    - Lab Report to be submitted at midnight on the day of your lab
    - Highly encouraged to attempt lab tasks before attending labs
    - Demonstrate select labs to the tutors
  - 2 Tutorials (Week 5 & 12)
    - Help with problem solving
    - Prep for exams
- Strongly encouraged to work in pairs (but individual submissions only)

# Assessment

- **Hands-on – 40%**
  - Labs 20%
  - Assignment 20%
    - Single assignment due in 12<sup>th</sup> Week
    - Implement a networking software (C/Java/Python)
- **Concepts and theory – 60%**
  - Mid-session test (20%)
    - In Week 6 (includes material from Week 1 to Week 5)
    - Closed-book MCQ
    - Negative marking enforced to deter random attempts
  - Final Exam (40%)
    - Closed-book written exam, End of semester
    - Critical thinking and problem solving questions
    - Hurdle component – must obtain at least 40% to clear

# Assessment

**NOTE:** To pass the course, a student MUST receive at least 40% marks on the final exam

lab = marks for lab exercises (scaled to 20)

assign = mark for the programming assignment (scaled to 20)

midExam = mark for the mid-semester exam (scaled to 20 marks)

finalExam = mark for the final exam (out of 40 marks)

mark = lab + assign + midExam + finalExam

grade = HD|DN|CR|PS if mark  $\geq 50 \ \&\& \text{ finalExam} \geq 16$

= FL if mark  $< 50 \ || \text{ finalExam} < 16$

**NOTE:** If you cannot clear the final exam hurdle, the maximum marks reported will be 40/100



# Getting help

- Use discussion forum for labs, assignment, and other matters at WebCMS
  - Fellow students benefit from your questions
  - Fellow students can answer your questions
  - Develop a community
- Please avoid emailing LiC/admin as much as possible; you may be directed to use forum if you email
- Consultation hours
  - LiC for lecture-related help - 2 hours each week
  - Lab consultation hours for lab and programming related help



# Accounts for accessing lab machines

- Use your zid/zpass to log into CSE computers
- New to UNSW -  
<https://it.unsw.edu.au/students/zpass/index.html>
- You will be automatically added as a student to the course website. Log on using zid/zpass

# Be original !!

- Collaboration
  - You may discuss approaches, not solutions
  - You must submit your own work
  - We strongly support discussions
- Plagiarism
  - Zero tolerance, don't do it



<https://my.unsw.edu.au/student/academiclife/Plagiarism.pdf>  
<https://student.unsw.edu.au/plagiarism>

# What is this course about ?

- Introductory (first course) course in computer network
  - Learn *principles* and *practice* of computer networking
- We use the Internet as a vehicle to understand the core concepts of networking

# What is this course about ?

1. To learn how the Internet works
  - Internet is a complex global infrastructure
  - What are the organising principles behind the Internet?
  - What really happens when you “browse the Web”?
  - What are TCP/IP, DNS, HTTP, NAT, VPNs, 802.11,... anyway?



# What is this course about ?

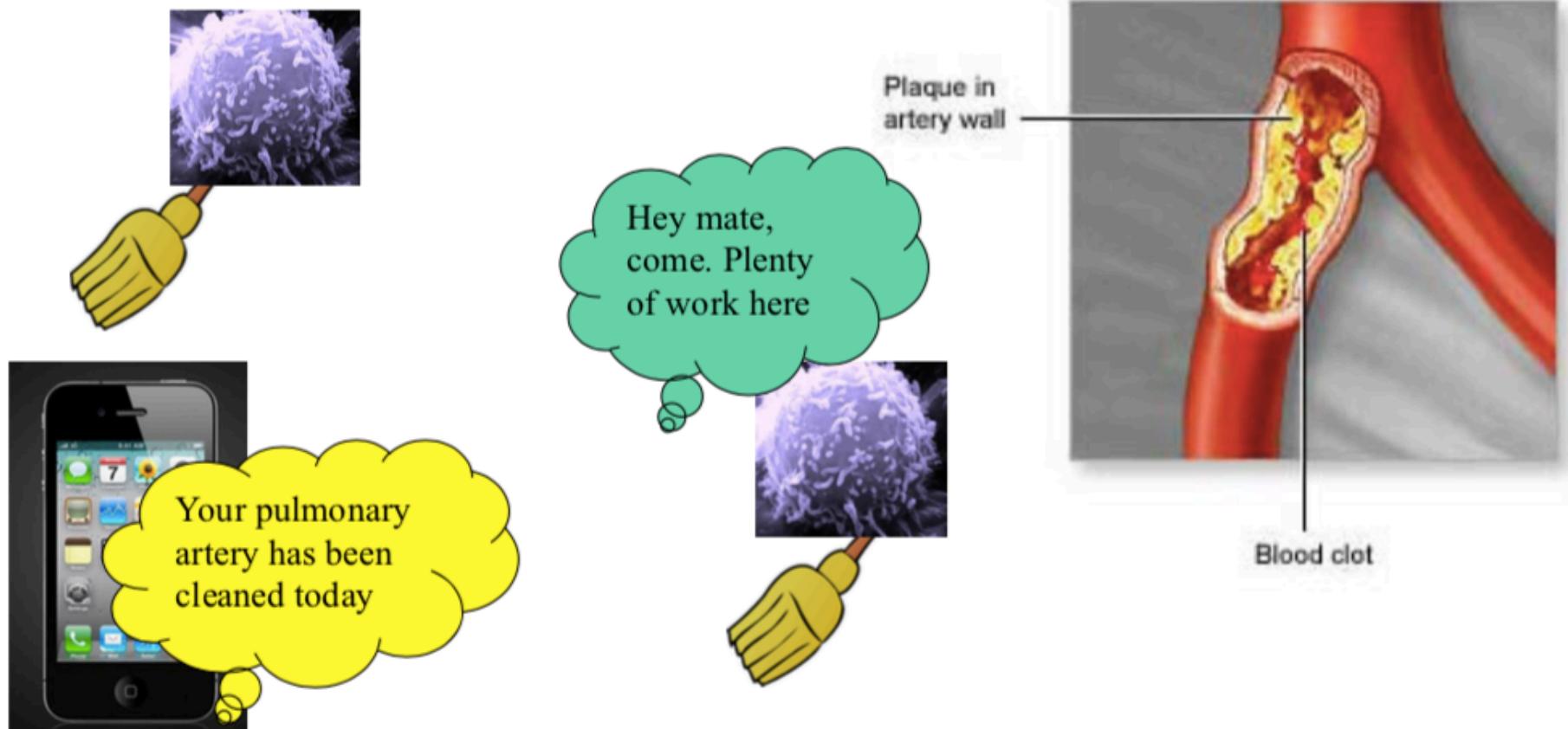
1. To learn how the Internet works
  - Internet is a complex global infrastructure
  - What are the organising principles behind the Internet?
  - What really happens when you “browse the Web”?
  - What are TCP/IP, DNS, HTTP, NAT, VPNs, 802.11,... anyway?
  
2. To learn the fundamentals of computer networks
  - What issue you need to take into consideration to make a computer network work well?
  - What design strategies have proven valuable?
  - How do we evaluate network performance?

# Why learn the fundamentals?

- Applicable to all computer networks
- Help you design new types of networks
- Change/reinvention
  - Today's Internet is different from yesterday's
  - And tomorrow's will be different again
  - But the fundamentals remain the same

# Nano-scale computer networks?

- $1 \text{ nm} = 10^{-9} \text{ m} = 1/25000$  diameter of a human hair
- Network of nanorobots to sweep the coronary plaque



# Pre-requisites



- Good understanding of algorithms, data structures and basic probability
- Proficient in programming: C, Java or Python

# Where do I go from here?

- COMP 9332: Network Routing and Switching
- COMP 9333: Advanced Computer Networks
- COMP 9334: System Capacity and Planning
- COMP 3441/9441: Security Engineering
- COMP 4335/9335: Wireless Mesh and Sensor Networks
- COMP 4336/9336: Mobile Data Networking
- COMP 4337/9337: Securing Wireless Networks
- COMP6733: Internet of Things
- Thesis Projects
- Research (Master's, PhD)