

# Computer Networks and Applications

COMP 3331/COMP 9331  
2021 T3

LIC: Salil Kanhere

## Course Outline & Logistics



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# Today's Agenda


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

## Course Staff

- Lecturer-in-Charge: Salil Kanhere
- Course Admin: Ayda Valinezhad Orang
- Tutors:
  - Adam Yi
  - Ali Dorri
  - Ayda Valinezhad Orang
  - Isuru Nirmal
  - Mohammad Yaghoubzadehfard
  - Pooja Gupta
  - Wei Song
  - Rui Li



# Resources

- <https://webcms3.cse.unsw.edu.au/COMP3331/21T3/>
  - 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
    - Exam Information
    - Consultation hours
    - **Announcement:** Your responsibility to check the announcement forum on regular basis for important updates/changes to schedule, etc.
    - **Your active participation and interaction is crucial to ensure that all of us get the most out of this course**
    - Note: You will need to login using your **zID/zPass**
- Very important
- 

# Me



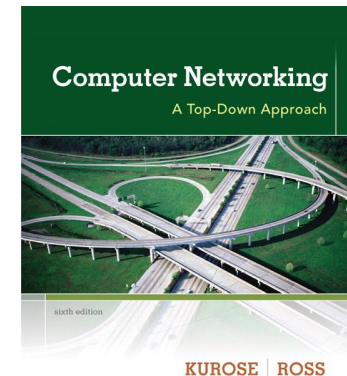
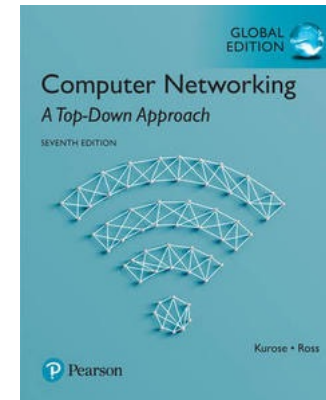
- Research
  - Internet of Things, Cyber Physical Systems, Pervasive Computing, Cybersecurity, Blockchain, Machine Learning
- Teaching
  - UG: COMP{1911, 1917, 1921, 1521, 3331, 6733}
  - PG: COMP{9331, 9332, 9333, 9337}
- Admin
  - Postgraduate Research Coordinator
- Life:
  - Science/Technology, Metal/Rock, Travel, Movies, Lifting heavy things, ...

## You

- Mix of UG (mostly 2<sup>nd</sup>/3<sup>rd</sup> year) and PG (mostly 1<sup>st</sup> year)
- Mostly CSE students but a few from other Engineering schools (Mech, EET) and Faculties (Business, Science, Law)
- Assumed Knowledge:
  - COMP1927/COMP2521/MTRN3500
  - Good understanding of data structures and algorithms and basic probability theory
  - Proficient in one of the following programming languages: C, Java or Python
  - We DO NOT assume that you know anything about computer networks

# 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

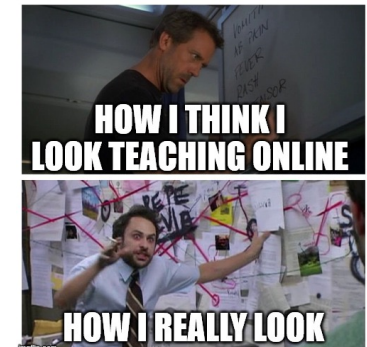


## Teaching/Learning Strategies

- Lectures (9 weeks, 4-hr per week)
- Labs
  - Hands-on learning
- Programming Assignment
  - Network programming and protocol design
- Weekly Homework (Self-assessed)
  - Problem solving skills

## Lectures

- Online via Zoom Meetings
  - **Links to the two weekly meetings on the Lectures Page**
- Weeks 1-5 and 7-10 (2 x 2-hour lectures x 9 weeks)
- Recordings
  - Youtube and Echo 360 Playlists (linked to the Lectures Page)
- We will focus on most important concepts and supplement with
  - Problem solving exercises
  - Discussions
  - News
- Certain material will be left for self study
  - These will be indicated on the lecture notes
- We will use Poll Everywhere quizzes a few times every lecture
  - For you to reinforce concepts
  - For me to get an indication of your understanding



# Quiz: The most useful superpower for a UNSW student would be:



A

Invisibility



B

Flight



C

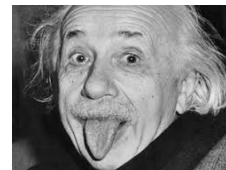
Telepathy



D

Time Travel

E: Some other power??

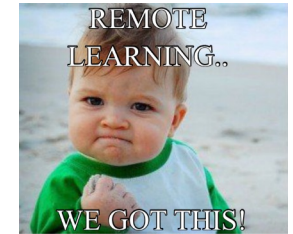


Type in your browser: [pollev.com/salil](https://pollev.com/salil)

## Labs

- 2-hour lab sessions starting **Week 2** (Weeks 2-5, 7-10)
- **All labs will be held online using Teams/Zoom – meeting links will be posted on course webpage**
- Hands-on experiments related to concepts covered in lectures
  - Wireshark packet sniffer, ns-2 network simulator, other network measurement tools, socket programming practice
- 8 lab sessions:
  - 6 Lab Exercises (guided by tutors)
    - 5 best performing labs out of 6 will be used for assessment
    - Lab report to be submitted (no demos)
    - Highly encouraged to attempt lab tasks before attending labs
  - 2 Problem-based learning sessions (Tutorials in Week 5 & 10)
    - No marks
    - Serves as preparation for exams

## Online Labs: VLAB



- Access CSE lab environment on your own machine remotely
- Uses VNC
- Recommended client: TigerVNC (<https://tigervnc.org>)
- Details: [https://taggi.cse.unsw.edu.au/FAQ/VLAB\\_-\\_The\\_technical\\_details/](https://taggi.cse.unsw.edu.au/FAQ/VLAB_-_The_technical_details/)
- UNSW VPN: <https://www.myit.unsw.edu.au/services/students/remote-access-vpn>
- China Students Access Network:  
<https://www.myit.unsw.edu.au/services/students/china-students-access-network>
- You will need to know basic command line Linux commands:  
<http://www.unixguide.net/linux/linuxshortcuts.shtml>

## Getting help



- Use online discussion forums (Ed Discussions)
  - Join via - <https://edstem.org/au/join/quFx6f>
  - Fellow students benefit from your questions
  - Fellow students can answer your questions
  - Develop a community
  - WebCMS forum is disabled
- Use **cs3331@cse.unsw.edu.au** for communication with us.
  - DO NOT email LiC/admin on personal email address
- Consultation hours
  - LiC for lecture-related help – 1.5 hours each week
  - Distinct consultations for assignment help - C/Python/Java
- Tutors
  - Establish an agreeable mode of communicating with your tutor

## Revisions based on myExperience Feedback

- More support for programming
  - Planning on some videos/support sessions
- More practice problems
  - Plan to make 2 sample exams available for both mid-term and final exams

## Code of Conduct

- CSE offers an inclusive learning environment for all students. In anything connected to UNSW, including social media, these things are student misconduct and will not be tolerated:
  - racist/sexist/offensive language or images
  - sexually inappropriate behaviour
  - bullying, harassing or aggressive behaviour
  - invasion of privacy
- Show respect to your fellow students and course staff



# Plagiarism



What is plagiarism?

Presenting the (thoughts or) work of another as your own. Cheating of any kind constitutes academic misconduct and carries a range of penalties. Please read course intro for details.

Examples of inappropriate conduct:

- groupwork on assignments/labs (discussion OK)
- allowing another student to copy your work
- getting your hacker cousin to code for you
- purchasing a solution to the assignment

**Remember:** You are only cheating yourself and chances are you will get caught!

# Plagiarism

- Labs, assignments, exams must be entirely your own work
- You **can not** work on assignment as a pair (or group)
- Plagiarism will be checked for and penalized
- Plagiarism may result in suspension from UNSW
- Scholarship students may lose scholarship
- International students may lose visa
- Supplying your work to any another person may result in loss of all your marks for the lab/assignment



# Assessment

- **Hands-on – 40%**
  - Labs 20%
  - Assignment 20%
    - Assignment released in Week 4, due in Week 10
    - Implement a networked application or protocol
    - We assume you are proficient in one of C/Java/Python
- **Concepts and theory – 60%**
  - Mid-term test (20%):
    - **Monday, 25<sup>th</sup> October 2021, 09:00 – 11:00 (Week 7)**
    - Open-book online exam
  - Final Exam (40%)
    - End of term
    - Open-book online exam
    - Hurdle – **must score at least 40% to pass the course**
  - Inspera platform, accessible through Moodle -  
<https://unsw.sharepoint.com/sites/Assessment-Platform-Pilot>

# Assessment

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

```
lab = marks for lab exercises (20 marks)
assign = mark for the programming assignment (20 marks)
midTerm = mark for the mid-semester exam (20 marks)
scaledfinalExam = scaled mark for the final exam (out of
40 marks)
mark = lab + assign + midTerm + scaledfinalExam
Grade:
= HD|DN|CR|PS if mark >= 50 && scaledfinalExam >= 16
= FL          if mark < 50 || scaledfinalExam < 16
```

**NOTE:** If you cannot clear the final exam hurdle (after scaling), reported grade would be 'UF' with maximum marks reported as 40

## How to do well in this course

- Keep up with and absorb all the content
- A critical/analytical viewpoint will help
- Solve all homework/practice problems
- Do the lab exercises *yourself*
- Do the assignment *yourself*
- Practice, practice, practice



# Fully Online Delivery

- We all need to work together
- Course Staff
  - Regular communication about upcoming deadlines (weekly notices)
  - Timely response to questions
  - Timely feedback on assessments
- Students
  - Take responsibility
  - Be aware of deadlines/deliverables and how to access resources
    - Links for lectures/labs/consults/exams
    - VLAB for labs and assignments
  - Check course notices regularly
  - Ask questions through the appropriate channels (online forum is preferred)
  - Participate in lectures and forum (community building)



## What is this course about ?

- Introductory 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?

## Where do I go from here?

- COMP 9332: Network Routing and Switching
- COMP 9334: System Capacity and Planning
- COMP 3441/9441: Security Engineering
- COMP 4336/9336: Mobile Data Networking
- COMP 4337/9337: Securing Wireless Networks
- COMP6733: Internet of Things Design Studio
- Thesis/Coursework Projects
- Research Degree (MPhil, PhD)

