Instructor

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Office Hours

10:00 to 11:00AM Wednesday

Course Objectives


Learning Outcomes

- Know the concepts of circuit switching, packet switching, virtual circuit network, and datagram network
- Know the layered structure and functions of each layer
- Understand how to calculate different types of delay in packet switching network
- Know properties of different types of physical media
- Know different multiplexing techniques
- Understand how error detection and correction work and how to estimate error detection probability
- Know how point-to-point links work
· Know how different types of LANs work
· Understand how to calculate performances of LANs
· Understand how to find shortest paths using routing algorithms
· Know different routing protocols
· Know how TCP/IP works
· Understand how to use NS3 to simulate different types of networks and its limitations
· Understand how to use Traceroute, Wireshark to get information about a network

**Textbook and References**

**Text:**

*Computer Networking: A Top-Down Approach Featuring the Internet*, Pearson, J. F.


**References:**


TCP/IP Illustrated, Vol. 1, W. R. Stevens, Addison-Wesley, 1994


**Links to Software, libraries, additional resources**

http://www.ietf.org

**Evaluation and Marking Scheme**

Attendance 20%
4 Assignments                          20%
Final Exam                               60%

Exams

The final examination is for evaluation purposes only and will not be returned to students. You will be able to make arrangements with the instructor or with the department office to see your marked final examination after the final grades have been made available.

General Regulations

- **Copyright on Course Materials**: The materials created for this course (including course outline, slides, posted notes, labs, project, assignments, quizzes, exams and solutions) are intended for personal use and may not be reproduced or redistributed or posted on any web site without prior written permission from the author(s).
- **Deferred Term Work**: Students who claim illness, injury or other extraordinary circumstances beyond their control as a reason for missed term work are held responsible for immediately informing the instructor concerned and for making alternate arrangements with the instructor and in all cases this must occur no later than three (3.0) working days after the term work was due. Consult the section 9.3 of the Graduate Calendar for more information.
- **Academic Integrity**: Students should be aware of their obligations with regards to academic integrity. Please review the information about academic integrity at: https://carleton.ca/registrar/academic-integrity/ This site also contains a link to the complete Academic Integrity Policy that was approved by the University's Senate.
- **Academic Accommodations**: Requests for Academic Accommodation You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:
  - Pregnancy obligation
    Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf
  - Religious obligation
    Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf
  - Academic Accommodations for Students with Disabilities
    If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. carleton.ca/pmc
  - Survivors of Sexual Violence
As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and is survivors are supported through academic accommodations as per Carleton’s Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: carleton.ca/sexual-violence-support

- Accommodation for Student Activities
  Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf

### Additional Information

**Deadline Policy:**

A minimum of one week, but normally ten days, will be allowed for completion of all assignments. Late assignments will not be accepted. All assignments shall be submitted online.

### Tentative Week-By-Week Schedule

0) Course arrangements, scope etc.

   Computer networks and the Internet

1) Packet vs. circuit switching. Delay. OSI model and TCP/IP architecture.

2) Application layer. Web and HTTP.

3) DNS and Peer-to-Peer. Issue Ass.1

4) Transport Layer. RDT.

5) TCP and congestion control. Ass. 1 due. Issue Ass. 2.

6) Network layer. Queuing theory.

7) IP protocol and SDN. Ass. 2 due. Issue Ass 3.

8) Control plane. Routing algorithms.

9) Routing protocols. SDN control plane.

10) Link layer and error detection. Ass. 3 due. Issue Ass. 4.
11) Multiple access links and protocols.

12) ARP, VLAN, MPLS. Ass. 4 due.