

CENG461/ELEC514

**Design and Analysis of
Communication Networks**

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Course web:

<http://www.ece.uvic.ca/~cai/461-outline.html>

Assessment for CENG 461

- Assignments 10%
- Midterm 30%
- Final 60%

Assessment for ELEC 514

- Assignments 10%
- Project 30%
- Midterm 20%
- Final 40%

ELEC 514: Course Project

- Choose your topic and let me approve it on/before Jan. 31
- Email me a 1-page project proposal in plain text or PDF format, on/before Mar. 1
- Submit the completed project report in PDF format, on/before April 15
- Start early
- Project information and reading list:
<http://www.ece.uvic.ca/~cai/514-project.html>

Prerequisites

- Elementary probability and statistics (STAT 254 or 260 or equivalent)
- CENG 460 or CSc 450 are not prerequisites; they *may* be taken concurrently.

Optional Textbooks

- Analysis of Computer and Communication Networks, by Fayez Gebali, Springer 2008.

Reference Books

- A. Leon Garcia and I. Widjaja, *Communication Networks*, McGraw Hill, 2003, Second Edition.
- Dimitri Bertsekas and Robert Gallager, *Data Networks*, Prentice Hall, Second Edition, 1992.
- Leonard Kleinrock, Richard Gail, *Queueing Systems: Problems and Solutions*, Wiley, March 1996. ISBN: 0-471-55568-1.
- M. Schwartz, *Broadband Integrated Networks*, Prentice Hall PTR, New Jersey, 1996, 0-13-519240-4.

Why taking this course?

- **Does God throw dice?**

→ Uncertainty is universal due to

- Finite resolution measurements
 - Uncontrollable, unpredictable variations
 - Simplification in Math/Physics modeling
 - Uncertainty principle in Quantum mechanics
 - Introduced in operations of the system purposely
 -
- Engineering systems have to operate well in the face of uncertainty
 - Examples

- Probability and random process are basic tools to model, understand and control uncertainty
 - Understanding the concepts is the key
 - The math is actually not difficult

This course begins with a thorough review of probability theory, and discusses in-depth the random process theory; then we apply the theories to model and study the performance of

- computer communication networks
- and other systems
 - Google search engine, page rank
 -

Course Topics

1. Computer communication networking
2. Probability and random process
3. Markov chains
4. Queuing analysis
5. Modeling of flow control protocols

Course Topics (2)

1. Modeling of error control protocols
2. Modeling of media access control protocols
3. Traffic modeling

- **Course notes and schedule are available**

<http://www.ece.uvic.ca/~cai/461-schedule.html>

User Name:

Password:

Why taking the course? (cont'd)

- How to use networks
 - not as a network user
 - but as a network engineer!
 - improve network efficiency, reliability, quality of services (QoS)
- How to design/analyze/engineer/improve network protocols
- Get a job in Google, Amazon, RIM, Microsoft,?

- Prepare for grad school?
 - Avg starting salaries in 2013 for new grads (US):
Electrical: BSEE \$61,420; MSEE \$72,340; PhD \$88,970.
Computer: BS/MS/PhD: \$61,270/\$70,850/\$89,440
 - Advanced degrees are in the high demand by both Fortune 500s and start-ups.
- Tools/methodologies for lifetime?
 - How to formulate, model complicated problems, and apply techniques to solve it?
 - How to deal with uncertainty, in daily life, in career life?

Q & A