Carleton University

Department of Systems and Computer Engineering

SYSC 4502 Communications Software Winter 2012

Course Outline

Instructor:
Associate Professor C. Huang
Room 4486ME
Tel: 520-5730
Email: changcheng.huang@sce.carleton.ca
http://www.sce.carleton.ca/faculty/huang.html

Prerequisites:
SYSC 4602 and (SYSC 2004 or SYSC 2100), and fourth year status in Electrical Engineering, Computer Systems Engineering, or Software Engineering, or third year status in Communications Engineering. Students who have not satisfied the prerequisites for this course must either a) withdraw from the course, or b) obtain a prerequisite waiver online at www.sce.carleton.ca/dept/us/academicsupport/forms , or c) will be deregistered from the course after the last day to register for courses.

Course Objectives:

Layered communication software models and Internet protocols. FSM, EFSM, and MSC. APIs and socket programming. Routing algorithms and data structures. Packet scheduling algorithms and real-time operating systems. Layer integration and implementation issues

Text: J. F. Kurose and K. W. Ross, *Computer Networking: A Top-Down Approach Featuring the Internet*, Addison Wesley, 2010. 5th edition.

References:

*Network Systems Design using Network Processors***,** D. E. Comer, Prentice-Hall, 2004

*Network Algorithmics***,** G. Varghese, Morgan Kaufmann, 2005

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

TCP/IP Illustrated, Vol. 2, G. R. Wright, W. R. Stevens, Addison-Wesley, 1995

Algorithms in C++, R. Sedgewick, 3rd edtition, Addison-Wesley, 1998

SDL Formal Object-oriented Language for Communicating Systems, J. Ellsberger, D. Hogrefe, and A. Sarma,, Pearson Education, 1997

An Introduction to Network Programming with Java, J. Graba, Springer, 2006

Patterns in Network Architecture, J. Day, Pearson Education, Inc., 2008

Object-Oriented Network Protocols, S. Boecking, Addison Wesley, 2000

http://www.ietf.org

Marking Scheme:

Lab.	20%
4 Assignments	10%
Mid-Term exam	20%
Final Exam	50%

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.

Class Schedule:

1:05pm-2:25pm, Wednesday and Friday, ME 4342.

Checking Marks:

Lists of term marks will be posted on dates to be announced. It is each student's responsibility to check that marks are correct or report any errors by the specified deadline.

Laboratory:

2:35pm-5:25pm Monday every other week at AA 507.

Final Exam: *Is for the evaluation purposes only and will not be returned to the student.*

Students with Disabilities:
Students with disabilities requiring academic accommodations in this course are encouraged to contact a coordinator at the Paul Menton Centre for Students with Disabilities to complete the necessary letters of accommodation. After registering with the PMC, make an appointment to meet and discuss your needs with me at least two weeks prior to the final exam. This is necessary in order to ensure sufficient time to make the necessary arrangements. Please note the following deadlines for submitting completed forms to the Paul Menton Centre: ***March 7, 2012*** for the Winter Term.

Plagiarism:
Plagiarism (copying and handing in for credit someone else's work) is a serious instructional offense that will not be tolerated. Please refer to the section on instructional offenses in the Undergraduate Calendar for additional information.

Review Week:
Accreditation of our Engineering programs requires that classes and laboratories, tutorials, or problem analysis sessions continue to run through the review period of the winter term. For 2010, the last day of normally scheduled classes (for non-engineering courses) falls on Wednesday April 5.

Course Schedule:

1) Course arrangements, scope etc.
Software architecture of computer networks and the Internet.

2) Data structures and algorithms

3) Application layer protocols. HTTP, FTP. Issue AS1

4) SMTP, DNS, P2P. API and socket programming.

5) FSM. Time Sequence Chart. Transport-Layer services. UDP. Reliable data transfer algorithms. AS1 due. Issue AS2.

6) FSM for Go-Back-N and Selective Repeat algorithms. AS1 due.

7) Winter break.

8) FSM for TCP protocol. AS2 due. Mid-term exam.

9) Network services. IP protocol and IP forwarding. Software implementation of IP forwarding. IP addressing and CIDR.

10) RIP, OSPF, BGP, ATM, MPLS. IP Multicast. AS2 due. Issue AS3.

11) Traffic classification.

12) QoS and traffic scheduling. AS3 due. Issue AS4.

13) Multimedia applications.

14) Preparation for final exam. PA sessions will be scheduled. AS4 due. Term marks will be posted - please check. Request for correction of errors must be received before Final Exam.