

CpSc 423, Computer Networks

Syllabus: Fall, 2008

Catalog Description: This is an introduction to computer networks and data communications. Course content includes: the layered model; transmission and multiplexing; data link protocols; packet, point-to-point, and satellite transmission; local area networks; security and privacy. Examples of some well-known networks will be studied. Prerequisite: CpSc 150. (3 credits)

Section	Time	Place
1	MWF 3 (10:00-10:50)	ATS 224

Instructor	Phone	Email	Office
Michael P. Conlon, Ph.D.	724-738-2143	michael.conlon@sru.edu	252 ATS

Office hours: M 12:00-1:00 p.m., W 3:00 p.m.-4:00 p.m., R 9:15 a.m.-12:15 p.m., or by appointment

Texts:

- *Computer Networks*, fourth edition; Tanenbaum; Prentice Hall. ISBN 0-13-0866102-3
- *Python in a Nutshell*, second edition; Martelli; O'Reilly. ISBN 978-0-596-10046-9
- *Learning Python*, third edition; Lutz; O'Reilly. ISBN 978-0-596-51398-6. This book is recommended to students who are not strong programmers.
- *Internetworking with TCP/IP, Volume 3, Linux/POSIX Sockets Version*; Comer and Stevens; Prentice Hall; ISBN 0-13-032071-4. Recommended. Computer science majors should own this book!

Exam dates:

Section	Exam 1	Exam 2	Final
1	Fri, Oct 3	Fri, Nov 7	Wed, Dec 10, 10:30-12:30

Grading:

Exams	Homework, quizzes, etc.	Projects
40%	20%	40%

Grading Policy: To pass this course you must take all exams, submit all assignments, and earn a passing grade. Late assignments will receive a grade of zero. Exceptions to this policy will be made in extraordinary circumstances.

Attendance, reading, and participation: You are expected to attend every class and to arrive on time. Do not expect to be admitted to class if you are late. Latenesses will be treated as absences. Please do all assigned reading *before* the class in which it is covered. You are expected to attend and participate in class, and you must do the reading and homework to participate.

Plagiarism policy: Students determined guilty of plagiarism or cheating will receive a failing grade for the course. While I encourage cooperation in study, please ensure that all written assignments are your own work.

Professional Development: You will be expected to participate in several professional

development activities in the course of the semester, such as attending lectures, assisting others with computer technology, attending job fairs, etc. If you cannot attend a particular assigned activity because of your other obligations, it is your responsibility to find another appropriate event as a substitute. Since the instructor does not produce these events, they are unpredictable and it will be wise to take advantage of early opportunities to fulfill this requirement.

Recording of Lectures: Video and/or audio recording of lectures is generally prohibited. The instructor reserves the right to reduce your grade should you make illicit recordings. Permission to record will be granted if there is an educational need for you to do so.

Copyright notice: By registering in this course you grant the SRU Computer Science Department permission to copy any of your work from the course for use in assessment or accreditation processes, provided that identifying information is removed from such work.

Exams: Exams will cover both text and lecture material; some text material may not be covered in class. If you must be absent for an examination, please see me one week in advance to make alternate arrangements to take the exam. Please take care of bodily needs before coming to an exam: you will not be permitted to leave the room during an exam until your paper is handed in. All electronic communication and entertainment devices must be turned off and put away during exams. Use of such devices during an exam will be considered cheating. You are permitted to bring a calculator to exams. Calculators with multi-line or graphic displays or with facilities for alphabetic input are not acceptable, and use of them will be considered cheating.

Course Outcomes: This course and its outcomes support the Information Systems, Information Technology, and Computer Science Learning Outcomes of *Problem Solving and Critical Thinking (PS&CT)*, *Communication and Interpersonal Skills (C&IS)*, and *Ethical and Professional Responsibilities (E&PR)*. These Information Systems, Information Technology, and Computer Science Learning Outcomes are tied directly to the University Wide Outcomes of *Critical Thinking and Problem Solving, Communication, and Values and Ethics*.

Objectives	Strategies	Assessment Methods
<p>The student will be able to:</p> <ol style="list-style-type: none"> 1. Describe what a layered network communication model is, and describe at least one such model in detail. [all 3: C&IS b] 2. Name several protocol suites and indicate their relationship to standard models such as the ISO Model for Open Systems Interconnection. [all 3: C&IS b] 3. Choose appropriate network hardware for real or hypothetical networks. [IS: PS&CT b, c IT: PS&CT a, d CS: PS&CT a, b] 4. Identify security and privacy issues that relate to computer networks. [IS: E&PR a IT: E&PR d CS: E&PR a] 5. Solve mathematical problems in such domains as: bandwidth & data rate, Hamming codes, cyclic redundancy check. [IS: PS&CT a, b IT: PS&CT a, d CS: PS&CT a, c] 6. Recognize the need for continuing professional development [all 3: E&PR e] 	<p>Together, the students and the professor will:</p> <ol style="list-style-type: none"> 1. Study the ISO OSI layered model and the function and technical issues of each layer. 2. Examine in detail at least one real-world network architecture. 3. Consider how hardware such as repeaters, switches, firewalls, etc., solve technical networking problems. 4. Discuss network security and privacy problems and people's attempts to solve them. 	<p>The student will:</p> <ol style="list-style-type: none"> 1. Answer questions about computer networks in homework and/or quizzes. 2. Complete a network project, such as setting up a local network or writing (a) networking computer program(s). 3. Complete exams that assess understanding of the principal concepts and techniques of computer networking. 4. Course Embedded: PS&CT through programming assignment, and E&PR at professor's discretion.

Calendar (tentative):

Date		Topic	Text Readings
Aug	25	Introduction	T, Sec 1.1-1.3
	27	Reference Models	T, Sec 1.4
	29	Example Networks and Standards	T, Sec 1.5-1.6
Sep	3	The Physical Layer: Fourier Analysis and Bandwidth	T, Sec 2.1
	5		
	8	Media and Wireless; Satellites	T, Sec 2.2-2.4
	10	The Public Switched Telephone System	T, Sec 2.5
	12	The Mobile Telephone System	T, Sec 2.6
	15	Cable television	T, Sec 2.7
	17	The Data Link Layer: Design Issues	T, Sec 3.1
	19	Error Correction: Hamming Codes	T, Sec 3.2
	22	Error Detection: parity and CRC	
	24	Data Link Protocols	T, Sec 3.3-3.6
	26	The Medium Access Control Sublayer: The Channel Allocation Problem, Multiple Access Protocols	T, Sec 4.1-4.2
	29	Ethernet	T, Sec 4.3
Oct	1	Wireless LAN's: WiFi 802.11	T, Sec 4.4
	3	Exam 1	
	8	Bluetooth and Data Link Layer Switching	T, Sec 4.6-4.7
	10	The Network Layer: Design Issues and Routing	T, Sec 5.1-5.2
	13	Congestion Control Algorithms, Quality of Service	T, Sec 5.3-5.4
	15	Internetworking; The Network Layer in the Internet	T, Sec 5.5-5.6
	17		
	20	The Transport Layer: The Transport Service	T, Sec 6.1; C&S, Ch. 5
	22	Elements of Transport Protocols	T, Sec 6.2
	24	A Simple Transport Protocol	T, Sec 6.3
	27	UDP	T, Sec 6.4
	29	TCP	T, Sec 6.5
	31	The Application Layer: The Domain Name System	T, Sec 7.1
Nov	3	Electronic Mail	T, Sec 7.2

Date	Topic	Text Readings
	5 The Worldwide Web	T, Sec 7.3
	7 Exam 2	
	10	
	12 Multimedia	T, Sec 7.4
	14 Network Security : Cryptography	T, Sec 8.1
	17 Symmetric Key Algorithms	T, Sec 8.2
	19 Public Key Algorithms	T, Sec 8.3
	21 Digital Signatures	T, Sec 8.4
	24 Management of Public Keys	T, Sec 8.5
Dec	1 Communication Security	T, Sec 8.6
	3 Authentication Protocols	T, Sec 8.7
	5 E-Mail and Web Security	T, Sec 8.8-8.9
	8 Social Issues	T, Sec 8.10
	10 Final exam, 10:30 a.m.-12:30 p.m.	