

Syllabus

Course Number: CS 450

Course Title: Data Networks

Course Description:

This course introduces the concepts and terminology of data communications and network design. Course topics include transmission techniques, network topologies, protocols, security, network control, and network architectures.

Prerequisite Courses:

CS336 Web and Database Applications

or

CS338 Mobile and Enterprise Computing

or

CS362 Control Structures (degree plans prior to Fall 2015 only)

Course Overview

The object of this course is to create the foundation upon which network implementations can be designed, analyzed, and improved upon. In addition, you will become aware of how the network infrastructure provides a mechanism for supporting new and ever beneficial applications. This course will provide the background information required to support good decisions concerning all aspects of the network.

Course Outcomes:

Upon completion of this course, learners should be able to:

1. Provide a unified overview of the broad field of data and computer communications,
2. Identify the basic principles of data communications and network design that unify this field, such as multiplexing, flow control, and error control,
3. Recognize alternative approaches to meeting specific communication requirements,
4. Explain how standards play an increasingly dominant role in this field,
5. Identify the requirements for data communications such as encoding, signaling, synchronization, media, and protocols,
6. Describe the need for security in the data communications environment and the solutions used to achieve secure communications, and

7. Explain the business need for interoperability and describe how internetworking devices and protocols are used to accomplish that end.
8. Design, implement, test, and validate code elements used in support of data networks.

Course Materials:

Required Texts:

Kurose James F. & Ross Keith W., (2013). *ComputerNetworking, A Top Down Approach*. (6th edition). Addison-Wesley (Pearson Education); ISBN: 978-0-13-285620-1.

Technology Tools:

- 1) Access to a PC-compatible computer system running Windows.
- 2) IP Subnet Calculator; can download from:
http://www.wildpackets.com/products/free_utilities/ipsubnetcalc/overview
- 3) A C++ Compiler (Dev-C++ free download)
<http://sourceforge.net/projects/orwelldevcpp/files/Setup%20Releases/>

Download the most recent version:

Dev-Cpp x.x.x MinGW x.x.x Setup.exe (32-bit version)

OR

Dev-Cpp x.x.x TDM-GCC x64 x.x.x Setup.exe (64-bit version)

- 4) A Java Compiler: <http://java.oracle.com>

NOTE: The compilers will be used to complete the programming assignments. Other compilers can be used, but the facilitator will be most familiar with the compilers listed above, and will most likely use the compiler to grade your programs. If a student chooses to use another compiler, it is the student's responsibility to obtain any help needed to use the software, and to insure that all assigned programs compile correctly on the compiler.

- 5) Wireshark Packet Analyzer: www.wireshark.org
- 6) Wireshark Users Guide. http://www.wireshark.org/docs/wsug_html

Supplemental Materials:

Palmer, M. and Sinclair, R.B. (2003). *Guide to Designing and Implementing Local and Wide Area Networks*. (2nd ed.). Boston: Thompson Course Technology.

Marcus, J. S. (1999). *Designing Wide Area Networks and Internetworks*. Upper Saddle River: Addison-Wesley.

Stallings, W., (2007). *Data and Computer Communications*. (8th edition). Upper Saddle River, NJ: Prentice-Hall; ISBN: 0-13-243310-9.

Week 1

Java Applets that reinforce the subjects discussed in Chapter 1 of the textbook:

- http://media.pearsoncmg.com/aw/aw_kurose_network_2/applets/transmission/delay.html
- http://media.pearsoncmg.com/aw/aw_kurose_network_2/applets/queuing/queuing.html
- http://media.pearsoncmg.com/aw/aw_kurose_network_2/applets/message/messagesegmentation.html

Wireshark video tutorial:

- <http://media-2.cacotech.com/video/wireshark/introduction-to-wireshark/>

Week 3

Java Applets that reinforce the subjects discussed in Chapter 3 of the textbook:

- http://media.pearsoncmg.com/aw/aw_kurose_network_4/applets/go-back-n/index.html
- http://media.pearsoncmg.com/aw/aw_kurose_network_4/applets/SR/index.html
- http://media.pearsoncmg.com/aw/aw_kurose_network_4/applets/flow/FlowControl.htm
- http://media.pearsoncmg.com/aw/aw_kurose_network_4/applets/fairness/index.html

Week 5

Java Applets that reinforce the subjects discussed in Chapter 5 of the textbook:

- http://media.pearsoncmg.com/aw/aw_kurose_network_2/applets/csmacd/csmacd.html

Pre-Assignment:

- READ *Chapter 1* in the text.
- Read pages 80-81 in the Wireshark Users Guide http://www.wireshark.org/docs/wsug_html
- Be prepared to **ask questions** on unclear areas in the assigned reading.

Online Format: Sign on to worldclass.regis.edu and become familiar with the course navigation of the Web Curriculum. Complete assignments above.

Classroom-based Format: Complete assignments above by the first night of class.

Course Assignments and Activities

	Topics	Readings	Activities Assignments and Associated Points
1	<ul style="list-style-type: none"> Data Communication & Networking Concepts 	Textbook: Ch. 1, pp. 1 – 67 Wireshark: pp. 80 – 84	Participation in Discussions (10% for entire course) Assignment #1 (10%)
2	<ul style="list-style-type: none"> Application Interfact (API) Concepts 	Textbook: Ch. 2, pp. 83 – 168 and 179 – 180 Wireshark lab: pp. 192 - 195	Participation in Discussions Assignment #2 (10%)
3	<ul style="list-style-type: none"> Transport Layer Concepts 	Textbook: Ch. 3, pp. 185 – 284 Wireshark (312, 313-314)	Participation in Discussions Assignment #3 (10%)
4	<ul style="list-style-type: none"> Network Protocols Concepts 	Textbook: Ch 4, pp. 305 – 412 and 438 – 439	Participation in Discussions Assignment #4 (10%)
5	<ul style="list-style-type: none"> Link Layer & Local Area Network Concepts 	Textbook: Ch 5, pp. 433 – 501 Wireshark: pp. 520 – 522	Participation in Discussions Assignment #5 (10%)
6	<ul style="list-style-type: none"> The Physical Layer Concepts 	Textbook: Ch 6, pp. 513 – 578 Etherreal Lab: pp. 59 and 594 – 596	Participation in Discussions Assignment #6 (10%)
7	<ul style="list-style-type: none"> Security and Internetworking Concepts 	Textbook: Ch. 8, pp. 671 – 743 and 753 Textbook: Ch. 9, pp. 771 – 800 803-804	Participation in Discussions Assignment #7 (10%)
8	<ul style="list-style-type: none"> Multimedia Network Concepts 	Textbook, Ch. 7, pp. 587 – 655 Assign. pp. 682 and 684 – 686	Participation in Discussions Assignment #8 (10%) Final Exam** (10%)
Total			100%

First night assignment is due on the first day of class, other assignments at the end of the week (online) or the beginning of the next class.

** Your facilitator may optionally assign a final exam.

Course Policies

Late Assignment Policy

If you have not negotiated something different with your facilitator, late assignments will be graded and then 3% will be deducted for each day the assignment is late, **up to one week late**. No assignment will be accepted more than **one week** after the official due date. Week 8 assignments will not be accepted more than **3 days** late.

Student Evaluation Summary

Assignment	Value (percent of overall course grade)**	
	With Final	Without Final
Participation	10%	10%
Assignments 1-6	10%	11%
Assignments 7-8	10%	12%
Final**	<u>10%</u>	<u>none</u>
TOTAL	100%	100%

**Your facilitator may assign a final exam. If a final exam is assigned, the percentages are taken from the left-hand column, otherwise the right-hand column is used.

CC&IS Grading Scale

Letter Grade	Percentage	Grade Point
A	93 to 100	4.00
A-	90 to less than 93	3.67
B+	87 to less than 90	3.33
B	83 to less than 87	3.00
B-	80 to less than 83	2.67
C+	77 to less than 80	2.33
C	73 to less than 77	2.00
C-	70 to less than 73	1.67
D+	67 to less than 70	1.33
D	63 to less than 67	1.00
D-	60 to less than 63	.67
F	Less than 60	0

Additional information about grading can be found in the latest edition of the University Catalog, available at <http://www.regis.edu/Academics/Course%20Catalog.aspx>.

CC&IS Policies and Procedures

Each of the following CC&IS Policies & Procedures is incorporated here by reference. Students are expected to review this information each term, and agree to the policies and procedures as identified here and specified in the latest edition of the University Catalog, available at <http://www.regis.edu/Academics/Course%20Catalog.aspx> or at the link provided.

- The CC&IS Academic Integrity Policy.
- The Student Honor Code and Student Standards of Conduct.

- Incomplete Grade Policy, Pass / No Pass Grades, Grade Reports.
- The Information Privacy policy and FERPA. For more information regarding FERPA, visit the [U.S. Department of Education](http://www.ed.gov).
- The HIPAA policies for protected health information. The complete Regis University HIPAA Privacy & Security policy can be found here: <http://www.regis.edu/About-Regis-University/University-Offices-and-Services/Auxiliary-Business/HIPAA.aspx>.
- The Human Subjects Institutional Review Board (IRB) procedures. More information about the IRB and its processes can be found here: <http://regis.edu/Academics/Academic-Grants/Proposals/Regis-Information/IRB.aspx>.

The CC&IS Policies & Procedures Syllabus Addendum summarizes additional important policies including, Diversity, Equal Access, Disability Services, and Attendance & Participation that apply to every course offered by the College of Computer & Information Sciences at Regis University.

A copy of the CC&IS Policies & Procedures Syllabus Addendum can be found here: <https://in2.regis.edu/sites/ccis/policies/Repository/CCIS%20Syllabus%20Addendum.docx>.

