

Syllabus

Course Title: Network Infrastructure

Course Number: CN 316

Course Description:

Introduces the foundations of network infrastructures and emerging network technologies. Covers OSI model in depth, including TCP/IP. Investigates the standards, design, architecture, and operation of LAN, WAN and telecommunications services. Introduces basic switching & routing concepts.

Prerequisite Courses:

CN 311 Systems Architecture

Course Overview

Network Infrastructure will provide the student with a basic knowledge and understanding of computer based networking. Computer networks are a fundamental element of communication in a digital age. This course will cover telecommunications, local area, wide area, wireless and other infrastructure types.

The following areas of focus will be covered to provide a student with the foundational understanding of computer networking so they are prepared for delving in to more detailed aspects of networks and networking devices.

- Network infrastructures
- Networking devices and equipment
- The OSI model, and in particular, the TCP and IP protocols
- Emerging technologies in the networking world

The course will define networking and architectural pieces along with providing understanding of connectivity mediums and usage.

Course Outcomes:

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

- Apply the layered approach to network architecture and the primary terminology, services and protocols associated with each layer.

- Determine expected network performance characteristics given various infrastructures, packet parameters and protocols.
- Characterize the functions and performance of the primary protocols of each OSI layer in terms of throughput, delay, reliability and security.
- Analyze the packet behavior at each OSI layer under various conditions utilizing a packet analysis tool on your computer.

Course Materials:

Required Texts:

Kurose, J. F., & Ross, K. W. (2012). *Computer Networking: A Top-Down Approach* (6th ed.). New York: Addison-Wesley. ISBN 978-0-13-285620-1 or 0-13-285620-4 hardcover.

American Psychological Association. (2010). *Publication Manual of the American Psychological Association* (6th ed.). Washington, DC: American Psychological Association. ISBN 1433805618, 978-1433805615. Companion website: <http://www.apastyle.org>.

Required Resources:

Kurose & Ross Companion Website for *Computer Networking, 6th ed.* Retrieved from <http://pearsonhighered.com/kurose-ross/>.

Important Note: This companion site provides multiple useful applets, exercises, and self assessment quizzes related to the Chapter readings. A 6 month subscription is included with textbook purchase, or available for purchase at <http://pearsonhighered.com/kurose-ross/>. Pay particular attention to the Message Segmentation applet, which highlights the performance differences between message and packet switching. Also, try the interactive exercise on One-Hop Transmission Delay. Go to the Errata subsection, and download the corrections which you should make to your text.

Lamping, U., Sharpe, R. & Warnicke, E. (2010). *Wireshark users guide*. Retrieved from http://www.wireshark.org/docs/wsug_html.

Important Note: The Wireshark Users Guide linked above is the reference document for installing and using Wireshark for packet analysis.

Lamping, U., Sharpe, R. & Warnicke, E. (2013). *Introduction to Wireshark*. Retrieved from <http://wiresharkdownloads.riverbed.com/video/wireshark/introduction-to-wireshark/>.

View this 5 minute video for a basic introduction to Wireshark.

Technology Tools:

Minimum Technology Requirements: <http://www.regis.edu/CPS/CPS-Student-Portal/College-for-Professional-Studies/Academic-Resources/Online-Learning/System-Requirements.aspx>

Optional Materials:

Regis Library: <http://www.regis.edu/library.htm>.

Pre-Assignment:

Online Format:

1. Login to this course in WorldClass to familiarize yourself with the course navigation to Content tab/page, Discussions tab/page, Dropbox tab/page, and Quizzes tab/page. The quiz tool is used throughout this course for Knowledge Checks.
2. Refer to the Course Assignments and Activities table below for Week 1 assigned readings.
3. Post your Introduction by Wednesday of Week 1 to the Discussion Forum titled, "Introductions."

Classroom-based Format:

1. Login to this course in WorldClass to familiarize yourself with the course navigation to Content tab/page, Discussions tab/page, Dropbox tab/page, and Quizzes tab/page. The quiz tool is used throughout this course for Knowledge Checks.
2. Refer to the Course Assignments and Activities table below for Week 1 assigned readings. This reading assignment is due the first night of class.

Course Assignments and Activities:

	Topics	Readings	Activities Assignments and Associated Points
1	Overview of Networking Concepts: A Top-Down Approach	Kurose & Ross, 6th Ed. (2013) Chapter 1 and Presentation. Lamping (2010). Wireshark Users Guide and Video Research Paper Writing Guide	<ul style="list-style-type: none">• Introductions – due by Wednesday of Week 1• Class Discussion / Forum Questions (30 pts)• Chapter 1 Knowledge Check• Lab 1 Wireshark Intro V6.0 (60 pts)• Final Project Specifications & Topic Selection
2	Inside Application Layer Functions and Protocols: <ul style="list-style-type: none">• Email and HTTP	Kurose & Ross, 6th Ed. (2013) Chapter 2 and Presentation.	<ul style="list-style-type: none">• Class Discussion / Forum Questions (30 pts)• Chapter 2 Knowledge Check• Lab 2 – Wireshark HTTP v6.1 (60 pts)• Final Project topic, summarize for instructor, class.

3	<p>Transport Layer Functions and Protocols:</p> <ul style="list-style-type: none"> • TCP & UDP • Reliable Data Transfer 	<p>Kurose & Ross, 6th Ed. (2013) Chapter 3.1 to 3.4 and Presentation.</p>	<ul style="list-style-type: none"> • Class Discussion / Forum Questions (30 pts) • Chapter 3 Knowledge Check (in Week 4) • Chapter 3 Review Questions (50 pts) • Lab 3 Wireshark UDP v6.1 (60 pts)
4	<p>Transport Layer (cont.)</p> <ul style="list-style-type: none"> • Flow Control & Congestion Control 	<p>Kurose & Ross, 6th Ed. (2013) Chapter 3.5 to 3.8 and Presentation.</p>	<ul style="list-style-type: none"> • Class Discussion / Forum Questions (30 pts) • Chapter 3 Knowledge Check • Lab 4 Wireshark TCP (60 pts)
5	<p>Network Layer Functions:</p> <ul style="list-style-type: none"> • IP Addressing 	<p>Kurose & Ross, 6th Ed. (2013) Chapter 4.1 to 4.4 and Presentation</p>	<ul style="list-style-type: none"> • Class Discussion / Forum Questions (30 pts) • Chapter 4 Knowledge Check (in Week 6) • Chapter 4 Review Questions (50 pts) • Lab 5 Wireshark DHCP (60 pts)
6	<p>Network Layer (cont.) Functions:</p> <ul style="list-style-type: none"> • IP Routing 	<p>Kurose & Ross, 6th Ed. (2013) chapter 4.5 to 4.8 and Presentation</p>	<ul style="list-style-type: none"> • Class Discussion / Forum Questions (30 pts) • Chapter 4 Knowledge Check • Lab 6 Wireshark ICMP (60 pts)
7	<p>The Link- Layer:</p> <ul style="list-style-type: none"> • Services and Protocols 	<p>Kurose & Ross, 6th Ed. (2013) Chapter 5 and Presentation.</p>	<ul style="list-style-type: none"> • Class Discussion / Forum Questions (30 pts) • Chapter 5 Knowledge Check • Lab 7 Wireshark Ethernet ARP (60 pts)
8	<p>Wireless LAN and Mobile Phone Connectivity</p>	<p>Kurose & Ross, 6th Ed. (2013) Chapter 6 and Presentation.</p> <p>Under the Applets section, select 802.11 CSMA/CA WITHOUT Hidden Terminals (Chapter 6), and 802.11 CSMA/CA WITH Hidden Terminals (Chapter 6).</p>	<ul style="list-style-type: none"> • Class Discussion / Forum Questions (30 pts) • Chapter 6 Knowledge Check • Submit Final Project Paper & Presentation/Discussion (250 pts)
			Maximum Points Possible: 1010

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>.