TCP/IP NET-215-81

Contact Information

Instructor	Dr. Tina Benson
Email	kbenson@champlain.edu
Office hours	Virtual Office hours: M/W 3:00 – 5:00 PM, T/TH evening 9:15-11:30 PM EST (not available Friday evenings or Saturday day)
Instant Messenger	AOL handle: DrTina777 (preferred method of contact as I'm online typically about 40 hours / week mostly afternoon/late evenings)
Phone	727-341-2293 (voicemail)

Course Information

Course Title	TCP/IP
Course Number	NET-215-81
Course Description	This course will provide detailed coverage of the Transmission Control Protocol/Internet Protocol (TCP/IP) suite, the *lingua franca* of the Internet. Network professionals today need to be thoroughly familiar with the Internet and TCP/IP, so here we are! Luckily, the subject is an interesting one and the Internet is a network that we all use, so although this is going to be very different than what many of you have seen before, you already have some basic familiarity. Although we will cover some theoretical stuff, this is a practical applications-oriented course, relying heavily on hands-on exercises.
Course Dates	01/07/0 - 04/25/08

Student Centered Learning Outcomes

Upon completion of this course, students will be able to:

- Compare and contrast the TCP/IP protocol suite with other protocol suites, and cite advantages and disadvantages of using TCP/IP.
- Articulate and construct an IP-based subnet addressing plan, with particular understanding of private vs. public addressing and subnet masks.
- Explain the protocol operation of the major components of the TCP/IP suite, recognize the data unit formats, and understand basic

troubleshooting (to include IP, ICMP, ARP, TCP, UDP, FTP, Telnet, Ping, HTTP, SMTP, POP, and DNS).
- Describe the relationship between IP, underlying network access protocols and technologies, and higher layer applications and services.
- Review the common security vulnerabilities associated with the TCP/IP protocol suite and ways to mitigate those vulnerabilities.
- Review the basic operation and function of IPsec and VPNs.
- Demonstrate the ability to troubleshoot IP-based networks using a protocol analyzer.

This course also addresses the college's core competencies in the following way:

- *Oral/written communication:* The applications and services that can be designed and implemented using the TCP/IP protocol suite often requires communication with an organization's non-technical management, customers, vendors, and users. Networking professionals have to be able to effectively communicate in both written and verbal form. These skills will extend those learned in other classes by use of papers, student presentations, and the demonstration of proper computer forensics techniques.
- *International awareness:* International issues are covered, as relevant. TCP/IP is the protocol used on the global Internet and there are few specific international issues.
- *Technology:* This course covers basic concepts related to networking protocols, and the application of TCP/IP protocols and services.
- *Critical Thinking:* Computer networks using TCP/IP often require performance analysis and troubleshooting, tasks that are more art than science. Extending TCP/IP to non-traditional applications and fitting those applications to the communication needs of an organization requires out-of-the-box thinking. Discussion and analysis of a variety of real and hypothetical scenarios will show students how to view TCP/IP as more than just getting two computers to talk with one another.

Textbooks

Required Texts

Guide to TCP/IP 2nd. ed. by Laura Chappell and Ed Tittel (Course Technology)

Other Supplementary Readings

- *TCP/IP Illustrated, Volume 1: The Protocols* by W. Richard Stevens (Addison-Wesley, 1994) is considered by many to be the "bible of TCP/IP" even though it is over ten years old. It is one of the best books available if you want a detailed

treatment of the basic protocols comprising TCP/IP. Many changes have occurred to TCP/IP since the book was written, however, so there are many new protocols that the book doesn't cover — e.g., Secure Shell (SSL), Secure Sockets Layer (SSL), IP version 6 (IPv6).

- *Troubleshooting TCP/IP* by Mark Miller (John Wiley & Sons, 1999) is a really good take on TCP/IP from the perspective of troubleshooting and protocol analysis.

- *TCP/IP Architecture, Protocols and Implementation with IPv6 and IP Security* by Sidnie Feit (McGraw-Hill, 2000) is another good TCP/IP text, this more from the user and usage perspective. It is currently available for purchase as a downloadable PDF file (7.9MB, 900+ pages).

- GaryKessler.net, with a number of papers and articles on topics related to this course and you should feel free to read and peruse them! In particular, take a look at the TCP/IP tutorial available at *http://www.garykessler.net/library/tcpip.html*.

- Packet sniffers and protocol analyzers are very useful tools if trying to understand protocols in action on real networks. There is a lecture in the course on the use of one such tool called tcpdump (and its Windows equivalent, WinDump). Students are encouraged to obtain tcpdump/WinDump and/or Ethereal/Analyzer. You might also find it useful to download this TCP/IP Pocket Reference Guide.

- Some other resources worth knowing about include:
  - The Internet Society Web site (www.isoc.org)
  - The Internet Engineering Task Force Web site (www.ietf.org)
  - The RFC Editor's Web site (www.rfc-editor.org)
  - Cisco Systems' *The Internet Protocol Journal* (www.cisco.com/ipj)

Topic Outline

Week 1: Introducing TCP/IP
Week 2: IP Addressing and Related Topics
Week 3: Data Link and Network TCP/IP Protocols
Week 4: Internet Control Message Protocol
Week 5: Transport Layer TCP/IP Protocols
Week 6: Basic TCP/IP Services
Midterm
Week 8: Domain Name System (DNS)
Week 9: The Dynamic Host Configuration Protocol
Week 10: Securing TCP/IP Environments
Week 11: Routing in the IP Environment
Week 12: Monitoring and Managing IP Networks
Week 13: TCP/IP, NETBIOS, and WINS
Week 14: Internet Protocol Version 6v
Final

Methods of Assessment

All projects will be graded using the grading matrix below:

Action Learning Grading System						
Code	**Written Assignment Guidelines**	**Low Score**	**To**	**High Score**	**Visual & Creative**	**Quantitative**
T	**Technical Quality & Presentation**	Spelling errors, poor punctuation and sentence structure. Sloppy presentation. Difficult to figure out.		Spelling, sentence structure and grammar are solid. Material is presented in an easy to read format. Good flow and layout.	Care and attention to detail. Care to use color, careful layout, titles etc.	Problem and calculations laid out neatly and in a logical sequence.
I	**Integration of Material**	Concepts missed or not addressed.		Material thoroughly integrated and includes outside examples. Concepts explained in your own words.	Concepts are covered by virtue of the material included.	Calculations and terms used that demonstrate and understanding of the business concepts behind the calculations.
E	**Expression: Quality & Completeness**	Sentences are lacking expression and wouldn't generate any interest on behalf of the reader.		Sentences relate to each other with feeling. Thoughts are developed and in a logical sequence.	Careful thought to what is included and why. Inclusive of everything that should be there.	
C	**Creativity & Critical Thinking**	Reiterate text with no interpretation or self-		Interpret concepts and find examples		

		expression. Short and hollow explanations. The safe way out.		that support or contradict them. Demonstrates the ability to take risk.		

- **Participation and Engagement**
  Attendance and involvement is measured though your presence and participation in the all aspects of the class. Your participation is extremely important to the learning experience for both you and your classmates.

  Class discussions, in which you willingly share your thoughts and ideas, are also an integral part of the class and your learning process. Your participation in discussion (and the assessment of discussions for grading) will be based on the following guidelines:

  1. Respond to others with questions or comments that provoke elaboration.
  2. Bring in resources from outside the class materials (website, reading in another class, work experience etc)
  3. Link the comments of two people in a very explicit way that has not been expressed.
  4. Demonstrate your interest with an active listening question to another.
  5. Build on another's thinking.
  6. Use the course materials, including quotes from readings, as "evidence" to support your thinking.
  7. Avoid unsupported opinion.
  8. Please describe any addition expectation you need to share

- **Class Activities:**
  Our class activities will consist of weekly discussion of our current topic. Students are expected to post frequently and throughout the week for maximum credit. Grade-able posts should be at least one paragraph and contain “new” information to further the class discussion. For example, students can provide insight, relevant personal experience, web links,
- **Weekly Assignments:**
  Each week, there will be an assignment to further reinforce reading and discussion. The textbook can be used as a starting point; however often use of outside sources or exploring your own computer (no changes to be made, just observation and reporting your findings) will generally be

required.

- **Projects:**
  A TCP/IP project and presentation on future trends will be required. The project will be a 3-4 page report using outside sources (i.e. websites, articles). The PowerPoint class presentation will summarize and offer additional information pertinent to our class discussion.
- **Testing Information:**
  The midterm and exam will be a combination of multiple choice, short answer, fill in the blank questions covering the content from the relevant chapters. The midterm will cover the first half of the course and the final the second part of the course (i.e. final is not cumulative; however, some terminology in earlier chapters might be used in the questions).

Grade Calculation

The following scale will be used to determine letter grades:

Grade	Range
A	93+
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
F	Below 60

Students With Special Needs

If you believe that you have a disability requiring accommodations in this class, please contact the Coordinator of Support Services for Students with Disabilities as soon as possible. After you receive your accommodation form, please see me so that I can work with you to implement them in a timely fashion.

Contact: Janine Allo, Coordinator of Support Services with Disabilities Office: Hauke 106A; Phone: 802-651-5961; Email: jallo@champlain.edu

Academic Honesty Policy

In the preparation and presentation of any assigned work-including examinations, tests, quizzes, term papers, reports, themes and other written or

oral exercises-every student shall conform to a strict standard of academic honesty. Any attempt to deceive a faculty member or to help another student to do so will be considered a violation of this standard. In all assignments, students must acknowledge the words and/or ideas of others taken from print or electronic media, whether a direct quotation or a paraphrase; any omission of this is dishonest. Cheating on examinations or tests consists of knowingly giving, receiving or using-or attempting to give, receive or use-unauthorized assistance during an examination or test. A faculty member may record a grade of "zero" for any assignment on which a student has plagiarized or cheated. For repeat offenses within a single course, the faculty member may record a grade of "F" for the course. Violations of this policy in multiple courses may result in dismissal from the College. A student may appeal these decisions according to the Academic Grievance Procedure.

Additional information

Brief Rationale Every computer on the Internet is speaking the language of TCP/IP. We would not be on the Internet now if we did not have TCP/IP. Since TCP/IP's earliest beginnings as a government research project of the 60s, TCP/IP has grown and adapted. We'll take a quick look at TCP/IP origins and focus on the current and future of TCP/IP.

Brief Statement of your Teaching Philosophy As a former online student myself (both my graduate degrees were partly completed online), I understand the joys and challenges of online study. I am happy to be your guide through the world of TCP/IP this term. Although our time together is fast paced, please let me know ASAP if you need assistance or if "life happens" unexpectedly.