IS 280 – Data Communications Systems
Course Syllabus and Calendar – Fall 2005

Professor Don Colton

Brigham Young University Hawaii

1 Course Overview

The world of computing has changed dramatically with the advent of the Internet and the World Wide Web. Further changes will amaze us as they unfold over the next few years.

The Internet and WWW are based on the principle that computers can share data through data communications systems. When more than two computers participate, these systems are called networks.

In this course we will learn the fundamentals of networking, including the standard "layers" of networking: Physical, Data link, Network, Transport, Session, Presentation, and Application. We will understand what happens at each layer, and how they work together. We will learn some binary mathematics to be able to work with binary, octal, hexadecimal, and decimal numbers. We will learn the IPv4 addressing system, including subnet addressing.

Most of all, we will learn the information covered in the CompTIA Network+ exam. Network+ is an industry-standard vendor-neutral test about networking. Students will have the opportunity to take this test as a part of earning their grade in this course.

This course will prepare you to take other courses in the IS department. IS 386 Computer Network Servers and IS 389 Computer Network Design build on your knowledge from IS 280. In IS 386 you will develop skill and experience configuring and operating network servers. In IS 389 you will develop skill and experience configuring networking equipment such as switches, routers, and gateways.

Prerequisites: The common prerequisite is IS 110 (Fundamentals of Information Systems). The purpose for this prerequisite is to ensure that you have the big picture of why networking is important and how it supports businesses and other organizations in achieving their goals.

1.1 The Course

- **Course Number:** IS 280
- **Title:** Data Communications Systems
- **Course Description:**
- **Textbook:** *Network+ Guide to Networks /3e*, by: Tamara Dean. ISBN 0-619-21313-2.
- **Section 1:** Class Time: MWF 2:00–2:50 PM
  Final Exam: Fri 16 Dec, 3:00–6:00 PM
  Classroom: GCB 150
- **Section 2:** Class Time: TTh 8:30–9:50 AM
  Final Exam: Thu 15 Dec, 12:00–3:00 PM
  Classroom: GCB 140

1.2 The Instructor

- **Instructor (me):** Don Colton
- **My email:** don@colton.byuh.edu
- **My Office:** GCB 130 B
- **Office Hours:** Daily 10:00–10:50 AM

1.3 The Tutors

- **T.A.:** Jeff Wiley or CS tutors
- **T.A. Hours:** Posted Evenings
- **T.A. Location:** GCB 147

1.4 Open-Door Policy

My office hours are shown above. You can contact me by email to make an appointment at another time. I also have an open-door policy: **If my door is open (even just a bit) feel free to knock and come in.**

2 Grading (not finalized)

Grading depends on several things. (1) Did you provide evidence of passing the CompTIA Network+ exam? (2) What top score did you earn on TestOut? (3) What score did you earn on the Binary test? (4) What score did you earn on the IPv4 test? (5) Did you build the required cables that tested out perfectly?

** Revision for Winter 2006: (2) What second highest score did you earn on TestOut?

Each test is done in a timed, controlled setting, typically in the classroom, under my supervision. Network+ is administered under the control of Prometric at the BYUH testing center or elsewhere.

For TestOut, the time limit is 40 minutes. Students typically complete it in 20 minutes when they are familiar with it.

For the Binary test, the time limit is 15 minutes.

For the IPv4 test, the time limit is 15 minutes. The test consists of 27 questions. Students typically complete it in 10 minutes when they are familiar with it.

2.1 The Grading Algorithm:

```
if ( earned(Network+)  ) { return A  }
if ( max(TestOut) < 40 ) {
   if ( quit attending ) { return UW }
   otherwise             { return F  }}
if ( max(TestOut) < 46 ) { return D- }
if ( max(TestOut) < 54 ) { return D  }
if ( max(TestOut) < 60 ) { return D+ }
if ( max(TestOut) < 66 ) { return C- }
if ( max(TestOut) < 74 ) { return C  }
if ( max(TestOut) < 80 ) { return C+ }
if ( correct cables < 2) { return C+ }
if ( 100% on binary < 2) { return C+ }
if ( 100% on IPv4   < 2) { return C+ }
if ( max(TestOut) < 83 ) { return B- }
if ( pending(Network+) ) { return I  }
if ( max(TestOut) < 87 ) { return B  }
otherwise                { return B+ }
```

2.2 To Earn a grade of A or I:

To earn an A grade, you must pass the CompTIA Network+ exam and provide evidence as required, by the final exam date for your section. If you do this, no other requirements apply.

You may pay for this exam personally, or you may receive a prepaid voucher by following the rules in the next section.

If you have already earned a grade of B and you are scheduled to take the Network+ exam, you can request a grade of I.

2.3 To Earn a grade of B:

To earn a grade in the B range (B-, B, or B+) or to get a prepaid voucher to take the Network+ exam, you must do the following things.

Twice you must complete the Binary test with a perfect score. Samples of this test are available on the web at the class homepage. Closed book. No calculator.

Twice you must complete the IPv4 test with a perfect score. Samples of this test are available on the web at the class homepage. Closed book. No calculator.

Twice you must build a straight-through or crossover cable, as specified by the teacher, in a controlled setting, using rj45 connectors and unshielded twisted pair (UTP) cable stock, with the resulting cable verified by a cable tester. You may consult notes and talk with other students, but you must do all the manual labor personally.

Twice you must complete the TestOut Network+ ExamSim test with a score of 80% or higher. 80% gets you a B-. 83% gets you a B. 87% gets you a B+. 90% gets you a B+ and a **prepaid voucher** to take the Network+ test.

2.4 To Earn a grade of C:

To earn a grade in the C range (C-, C, or C+), you must complete the TestOut Network+ ExamSim test with a score of 60% or higher. 60% gets you a C-. 66% gets you a C. 74% gets you a C+.

2.5 To Earn a grade of D:

To earn a grade in the D range (D-, D, or D+), you must complete the TestOut Network+ ExamSim test with a score of 40% or higher. 40% gets you a D-. 46% gets you a D. 54% gets you a D+.

2.6 To Earn a lower grade:

To earn an F in this class, you must attend class regularly and devote your attention to the class while you are present. If you do not attend class regularly, you can receive a grade of UW. A UW is worse than an F because it does not count as credits attempted.

To earn a grade of W, you must withdraw formally and I must believe that you would have passed the class if you stayed in.

2.7 Final Exam:

The final exam period will consist of several final attempts to complete the TestOut Network+ ExamSim test, cable construction, Binary test, and IPv4 test, in a timed and controlled setting.

Once you have completed any or all of these tests to a level with which you are satisfied, you have completed that part of the final exam.

3 Course Calendar

Each week the lectures will address the materials from one chapter of the textbook. There are about 15 weeks. There are about 15 chapters.

Also time will be spent studying for the Binary test and the IPv4 test.

Finally, time will be spent practicing the Network+ ExamSim test in a controlled setting to evaluate your progress and give you a chance to become more familiar with its operation.

4 Expected Outcomes

This course is intended to give students an understanding of networking and telecommunications. The expected outcomes for this course are that the student will be able to do the following.

1. Explain the history of networks, and the Internet.

2. Explain the different objects, media, and devices necessary for telecommunications, including local and wide area networks.

3. Explain how to install the equipment necessary to implement a telecommunication system, e.g., cables, modems, Ethernet connections, hubs, switches, and gateways.

4. List network architectures, topologies, and protocols.

5. Identify network standards and standardization bodies.

6. Explain logical addressing (IPv4), subnetting, network classes, private IP addresses, and MAC addresses.

7. Design, install, configure, and manage a simple LAN, install services, and connect the LAN to the Internet. (This outcome may be better associated with the IS250L or IS386.)

8. Identify common network services including: file, print, mail, communication, and Internet services.

9. Identify the importance of DHCP and DNS servers.

10. Identify the responsibilities inherent in providing network services including: security, privacy, reliability, and performance.

11. Explain the economics of networks in organizations, e.g., total cost of ownership, and cost-benefit analysis.

12. Demonstrate the use of common network applications such as: SSH, Telnet, FTP, remote access, e-mail, and IP telephony.

13. Demonstrate how to use TCP/IP utilities like: ping, trace route, netstat, nslookup, whois, ipconfig, and ifconfig.

4.1 Subject to Change

It is possible that I will revise some aspects of the course as we go along. Any changes I make are likely to be to your advantage. If any of my changes seems unfair to you, let me know. I will try to correct it.

5 Special Needs

Brigham Young University Hawaii is committed to providing a working and learning atmosphere, which reasonably accommodates qualified persons with disabilities. If you have any disability that may impair your ability to complete this course successfully, please contact the students with Special Need Coordinator, Leilani A'una at 293-3518. Reasonable academic accommodations are reviewed for all students who have qualified documented disabilities. If you need assistance or if you feel you have been unlawfully discriminated against on the basis of disability, you may seek resolution through established grievance policy and procedures. You should contact the Human Resource Services at 780-8875.

6 Preventing Sexual Harassment

Title IX of the education amendments of 1972 prohibits sex discrimination against any participant in

an educational program or activity that receives federal funds, including Federal loans and grants. Title IX also covers student-to-student sexual harassment. If you encounter unlawful sexual harassment or gender-based discrimination, please contact the Human Resource Services at 780-8875 (24 hours).