IT 280 – Computer Networking
Course Syllabus and Calendar – Fall 2013

Professor Don Colton

Brigham Young University–Hawai'i

Contents

1 Overview

It is hard to imagine a world without the Internet. Networking has made the sharing of information much faster than it was before. We get emails and instant messages with pictures attached instead of waiting days for postal delivery. We register "online" for classes instead of waiting "in line" to pull computer cards. We buy worldwide from Amazon or eBay or locally from Craig's List instead of visiting our local bricks-and-mortar store. We research on Google instead of at the library.

People love being connected. But sometimes networks break. The world needs workers with technical skills. This course is focused on those skills: creating wiring, connecting computers, and making networks.

This course is an introductory course that will prepare you to understand, set up, and operate your own home network, or small business, or maybe even Internet Café. You will understand the fundamentals of networking and what things are necessary for success with those activities.

This course lays the foundation to prepare you to take other courses in the IT major, such as:

IT 426, Computer Network Servers, is an advanced course where you can develop skill and experience configuring and operating network servers.

IT 480, Computer Network Design, is an advanced course where you can develop skill and experience configuring networking equipment such as switches and routers.

1.1 Preparation

We assume you have no special networking experience whatever. We expect you can read, type, send and receive email, and visit web sites. Everything else we will teach you.

1.2 There May Be Changes

Like all courses I teach, I will be keeping an eye out for ways this one could be improved. Changes generally take the form of opportunities for extra credit, so nobody gets hurt and some people may be helped. If I make a change to the course and it seems unfair to you, let me know and I will try to correct it. If you are brave enough, you are welcome to suggest ways the class could be improved.

I may digitally record the audio of my lectures some days. This is to help me improve my teaching materials.

2 Course Details

2.1 About the Course

- **Course Number:** IT 280
- **Title:** Computer Networking
- **Course Description:** End-user fundamentals including local area networks, home networks, wireless networks, routers, firewalls, ports, address sharing, dynamic host configuration, OSI model, IPv4, netmasks, subnets, and troubleshooting.
- **Textbook:** Networking 101, by Don Colton.
- **Classroom:** GCB 111
- **Start/End:** Mon, Sep 9 to Mon, Dec 8
- **Class Time:** MWF 14:30 to 15:30
- **Final Exam:** Fri, Dec 13, 16:00–18:50

2.2 My Websites

Here is a list of my other websites that you may encounter this semester.

- http://byuh.doncolton.com/it280/ is my course homepage. It has links to everything.
- http://n101.tk/ is the textbook I wrote for this class.
- https://dcquiz.byuh.edu/ is the learning management system for my courses.
- http://byuh.doncolton.com/ is my campus homepage. It has my calendar and links to the homepages for each of my classes.
- http://doncolton.com/ is my off-campus homepage.

2.3 About the Instructor

- **Instructor (me):** Don Colton
- **My email:** doncolton2@gmail.com
- **My Office:** GCB 128
- **Office Hour:** MWF 13:10 to 13:40.

I have reserved GCB 111 on MWF 13:20 to 14:20, the hour between my CIS 101 class and my IT 280 class, so my students and others can study in a lab setting and meet with each other and with me. The room is available as an Open Lab for your use either individually or in groups, for my class or for other classes. MWF 13:10 to 13:40 I will be present in GCB 111 or in my office to assist students that come.

2.4 About the Study Guide

I provide a study guide for this course. The study guide provides current details and specific helps for each assignment. It provides guidance for taking the exams.

http://byuh.doncolton.com/it280/2135/sguide.pdf has the study guide for this course.

The study guide will be updated as needed throughout the semester, as new assignments are given or due dates are established.

3 Learning Objectives

The following is a statement of the high-level learning objectives for this course. Each objective can be further divided into many smaller objectives.

By the conclusion of this course, students will do the following:

Internet: Explain how the Internet works. This includes topics such as connecting to the Internet, using the domain name system and using dynamic host configuration.

Home Networking: Properly set up a home network. List and explain the different objects, media, and devices used in a home network that is connected to the Internet through an ISP. Design, install, configure, and manage a simple LAN, install services, and connect the LAN to the Internet.

Wireless Networking: Design, install, configure, and manage a simple wireless LAN. This includes channel selection, WEP/WPA, SSID, and antenna considerations.

Security: Explain what security typically exists and how to get more. Includes password selection, firewalls, and issues with opening up ports for gaming.

Theory: Explain the following basic concepts: OSI 7-layer stack, protocol data units (packets, frames, etc.), udp, tcp, arp, and ports.

IPv4 Addressing: Explain network masks, subnetting, address classes, private IP addresses, MAC addresses, collision domains, broadcast domains, and what a LAN is.

Power Tools: Demonstrate the use of common

network applications and utilities including ping, traceroute, ipconfig, dig, nmap, ssh, telnet, ftp, and Wireshark.

4 Grading

Here is the actual grade distribution from Fall 2012: (18 students): grade average 3.31, 4.0x9 3.7 3.4 3.0x3 2.7x2 2.0 0.0.

Here is the actual grade distribution from Winter 2013: (16 students): grade average 3.74, 4.0x11 3.7 3.4x2 3.0 2.4

Grading is based on Effort (30%), Labs (16%), Skills Tests (14%), and Memorization Exams (40%). I have made available about 10% extra credit.

4.1 Grading Scale

I use a 60/70/80/90 model based on 1000 points.

Based on 1000 points

930+	A	900+	A–	870+	B+
830+	B	800+	B–	770+	C+
730+	C	700+	C–	670+	D+
630+	D	600+	D–	0+	F

4.2 Tracking Your Grade

I keep an online gradebook so you can see how your points are coming along. It also lets you compare them with other students in the class (without seeing their names).

https://dcquiz.byuh.edu/ is my personal Learning Management System. That is where I maintain my online grade book.

Your points are organized into two grade books: Overall and Effort.

2135 IT 280 Overall Grade Book: This includes the total from Effort and adds your exam performance. It also shows your final grade.

2135 IT 280 Effort Grade Book: This tracks the daily updates and study time.

4.3 Effort: Daily Update (50 points)

Each day in class starts with the "daily update" (DU). It is my way of reminding you of due dates and deadlines, sharing updates and news, and taking roll. It is your way of saying something anonymously to each other and to me. It must be taken in class during the 10-minute window of time that starts 5 minutes before class and ends 5 minutes into class.

The DU is worth two points per class period, with 50 points expected (for 25 out of about 37 class periods), and about 75 points possible. Anything beyond 50 is extra credit. It is also a reward for coming on time, or close enough that you can do the update.

As part of the Daily Update, once a week I will ask you how much time you spent studying the previous week. I will use your report to update your study time points.

4.4 Effort: Study Time (250 points)

We award points for study time (ST), which is time spent engaging with materials directly related to this course.

Each week you are invited to report, on your honor, how many hours you studied during the previous week, Sunday morning through Saturday night. We award two "effort" points per hour of "study," for a goal of 18 points (9 hours, including class time) and a maximum of 20 points (10 hours) per week, whether there is a holiday or not.

There are 14 weeks. 14 x 18 = 252. 14 x 20 = 280 (max). Anything beyond 250 points is extra credit.

Most students max out the study time points each week. This provides them with extra credit that helps ensure they get a good grade in the class.

Carry Forward: If you study more than the maximum time for which I will give credit, you are invited to report them, and also carry forward the extra hours and report them in the next week. For example, since 10 hours is the maximum that counts, if you studied 15 hours, you would report 15 hours of study, and I would count the first 10 hours. You would then take the remaining 5 hours and count it toward the following week.

There is no Carry Backward.

4.5 Effort Points are Optional

The effort points (daily update and study time) are there as a safety net. They are easy to earn. They help to make sure you will pass the class.

But when I calculate your final grade, I do it two ways:

(a) Counting every point, based on 1000 total points.

(b) Counting all but daily update and study time, based on 700 total points.

I grade both ways because some students have previous experience (or natural genius) and do not need to study as much.

I use whichever method gives you the best grade.

4.6 Skill: (400 pts) "E" Exams

E1 through E7: These exams cover the readings in Units 1 through 7. Honestly the exams are mostly about memorizing terminology and knowing answers to commonly asked questions.

Each test has a regular take. Every test has a "pretake." The pretake score is granted a 10% bonus. The tests are listed here with the estimated number of points in each test. If the actual number of points differs, the total will be scaled to 400.

E1: (47 pts) Basics, Unit 1

E2: (83 pts) OSI Model, Unit 2

E3: (57 pts) Home Networking, Unit 3

E4: (33 pts) Wi-Fi, Unit 4

E5: (57 pts) Security, Unit 5

E6: (78 pts) IPv4, Unit 6

E7: (45 pts) Tools, Unit 7

4.7 Skill: (140 pts) "S" Exams

SN: (70 pts) q25 Skill Numbers

SS: (70 pts) q50 Skill Subnets

SV: (50 pts) q51 VLSM Subnets (extra credit)

The SN and SS skills-based exams are based on skills taught in the book or in class and are worth 140 points (70 each). The SV exam is extra credit. It is also covered in the text book. SV is an all-or-nothing situation involving about 10 to 15 questions.

Retakes: Because these are easy to grade but can require time to master, you can take these each exam day, and your highest score will be kept.

The Final Exam time is Fri, Dec 13, 16:00–18:50. I plan that it will consist of an opportunity to retake any or all exams previously given. If you are already satisfied with your scores, you can skip the final.

4.8 Skill: (160 pts) Labs

L1: (40 pts) Lab 1: Ethernet Cables

L2: (40 pts) Lab 2: Router Configuration

L3: (40 pts) Lab 3: Wi-Fi Site Survey

L4: (40 pts) Lab 4: Dia Network Diagram

4.9 Extra Credit Presentation

You can get 50 points for doing a presentation. Propose a networking topic. Get me to approve it. Research it. Write up your research. Submit your write-up (PDF) to me. Then I will schedule your presentation. Do a 10-minute presentation in class where you teach us all about your research.

Sample networking topics: Spanning Tree, Virtual LANs, the Latest Thinking on Passwords, Certificates, Torrents, Ethics, Being anonymous, Firewalls, Topologies, Setting up a File Server, Setting up a Print Server.

You must submit your write-up by November 15.

4.10 Other Extra Credit

Report an error in the published materials I provide. In this class, they include the following:

- The course website, parts relating to this semester.
- The course syllabus.
- The course study guide.
- The course textbook, which I wrote.

Each error reported can earn you extra credit. (Typos in my email messages are too common and do not count.)

5 Calendar

We meet about 37 times plus the final.

See the study guide for dates and deadlines.

5.1 Special Dates

Mo Sep	09	First Day of Instruction
Fr Sep	13	E1 pretake
Fr Sep	20	E1 exam
Fr Sep	27	E2 pretake
Fr Oct	04	E2 exam
Fr Oct	11	E3 pretake
Fr Oct	18	E3 exam, E4 pretake
Fr Oct	25	E4 exam
Fr Nov	01	E5 pretake
Fr Nov	08	ISECON, No Class
Fr Nov	15	E5 exam, E6 pretake
We Nov	20	EIL Program Review, No Class
We Nov	27	E6 exam, E7 pretake
Fr Nov	29	Thanksgiving Friday, No Class
Fr Dec	06	E7 exam
Mo Dec	09	Last Day of Instruction
Fr Dec	13	Exam Retakes, 16:00–18:50

5.2 Excused Absences

I have built a bit of slack into the grading so you can miss a few days (or assignments) if you need to, and still earn an A. Taking a friend to the airport? Taking your spouse or child to the doctor? Taking a field trip for another class? No problem. You are excused.

The scheduled final exam consists of an opportunity to retake **any** exam that was offered during the semester. If you are happy enough with your previous scores, **you can skip the final.**

Beyond that I do not offer special treatment to anyone except in HIGHLY unusual situations.

If you have to miss an E exam, since there are three chances to take each one, my advice is to study harder for one of the other opportunities.

If you have to miss an S exam, there are more than three chances to take each one, my advice is to study harder for one of the other opportunities.

6 Support

The major forms of support are (a) open lab, (b) study groups, and (c) tutoring.

If you still need help, please find me, even outside my posted office hours.

6.1 Office Hour / Open Lab

I have reserved GCB 111 on MWF 13:20 to 14:20, the hour between my CIS 101 class and my IT 280 class, so my students and others can study in a lab setting and meet with each other and with me. The room is available as an Open Lab for your use either individually or in groups, for my class or for other classes. MWF 13:10 to 13:40 I will be present in GCB 111 or in my office to assist students that come.

The CIS department operates an open lab with tutors in GCB 111 most afternoons and evenings.

6.2 Study Groups

You are encouraged to form a study group. If you are smart, being in a study group will give you the opportunity to assist others. By assisting others you will be exposed to ideas and approaches (and errors) that you might never have considered on your own. You will benefit.

A good time for your study group to meet is during the open lab time. Eat lunch together (carefully) and work on the class activities.

If you are struggling, being in a study group will give you the opportunity to ask questions from someone that remembers what it is like to be totally new at this subject. They are more likely to understand your questions because they sat through the same classes you did, took the same tests as you did, and probably thought about the same questions that you did.

Most of us are smart some of the time, and struggling some of the time. Study groups are good.

6.3 Tutoring

The CIS department provides tutoring in GCB 111, Monday through Friday, typically starting around 5 PM and ending around 11 PM (but earlier on Fridays). Normally a schedule is posted on one of the doors of GCB 111.

Tutors can be identified by the red vests they wear when they are on duty.

Not all of the tutors know about everything. But all of the tutors should know which tutors do know about whatever you are asking about, so they can direct you toward the best time to get your questions answered.

There are networking-savvy student workers in GCB 103. They are not dedicated tutors like the 111 tutors. Instead, they work on building the CIS network and maintaining the CIS labs. But they are sometimes available to answer questions.

If you still need help, please come and see me, even outside my posted office hours.

7 BYUH Learning Framework

I believe in the BYUH Framework for Learning. If we follow it, class will be better for everyone.

7.1 Prepare for IT 280

Prepare: Before class, study the course material and develop a solid understanding of it. Try to construct an understanding of the big picture and how each of the ideas and concepts relate to each other. Where appropriate use study groups to improve your and others' understanding of the material.

In IT 280: Do the readings for each unit before the first unit test. There is more than we could cover in class because we all learn at different rates. Our in-class time is better spent doing activities and answering your questions than listening to my lectures.

7.2 Engage in IT 280

Engage: When attending class actively participate in discussions and ask questions. Test your ideas out with others and be open to their ideas and insights as well. As you leave class ask yourself, "Was class better because I was there today?"

In IT 280: Participate in the in-class activities. Those that finish first are requested to help those that want assistance. It is amazing what you can learn by trying to help someone else.

7.3 Improve at IT 280

Improve: Reflect on learning experiences and allow them to shape you into a more complete person: be willing to change your position or perspective on a certain subject. Take new risks and seek further opportunities to learn.

In IT 280: After each exam, I usually allow you to see every score and every comment and every answer submitted for every question. Review your answers and those of other students. See how your answers could be improved. If you feel lost, study the assigned readings again and ask questions.

8 Standard Statements

All syllabi are encouraged or required to address certain topics. These are generally considered to be common sense, but we find that it is useful to mention them explicitly anyway.

8.1 Dress and Grooming Standards

The dress and grooming of both men and women should always be modest, neat and clean, consistent with the dignity adherent to representing The Church of Jesus Christ of Latter-day Saints and any of its institutions of higher learning. Modesty and cleanliness are important values that reflect personal dignity and integrity, through which students, staff, and faculty represent the principles and standards of the Church. Members of the BYUH community commit themselves to observe these standards, which reflect the direction given by the Board of Trustees and the Church publication, "For the Strength of Youth." The Dress and Grooming Standards are as follows:

Men. A clean and neat appearance should be maintained. Shorts must cover the knee. Hair should be clean and neat, avoiding extreme styles or colors,

and trimmed above the collar leaving the ear uncovered. Sideburns should not extend below the earlobe. If worn, moustaches should be neatly trimmed and may not extend beyond or below the corners of mouth. Men are expected to be clean shaven and beards are not acceptable. (If you have an exception, notify the instructor.) Earrings and other body piercing are not acceptable. For safety, footwear must be worn in all public places.

Women. A modest, clean and neat appearance should be maintained. Clothing is inappropriate when it is sleeveless, strapless, backless, or revealing, has slits above the knee, or is form fitting. Dresses, skirts, and shorts must cover the knee. Hairstyles should be clean and neat, avoiding extremes in styles and color. Excessive ear piercing and all other body piercing are not appropriate. For safety, footwear must be worn in all public places.

8.2 Accommodating Special Needs

Brigham Young University–Hawai'i 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, you are invited to contact the Students With Special Needs Coordinator at 808-675-3518. Reasonable academic accommodations are made for all students who have qualified documented disabilities.

8.3 Plagiarism

We learn by watching others and then doing something similar.

Sometimes it is said that plagiarism is copying from one person, and research is copying from lots of people.

When you are having trouble with an assignment, I encourage you to look at not just one, but many examples of work done by others. Study the examples. See what you can learn from them. Do not automatically trust that they are right. They may be wrong.

http://en.wikipedia.org/wiki/Plagiarism has a wonderful article on plagiarism. Read it if you are not familiar with the term. Essentially, plagiarism is when you present the intellectual work of other people as though it were your own. This may happen by cut-and-paste from a website, or by group work on homework. In some cases, plagiarism may also create a violation of copyright law. If you borrow wording from someone else, identify the source.

Intentional plagiarism is a form of intellectual theft that violates widely recognized principles of academic integrity as well as the Honor Code. Such plagiarism may subject the student to appropriate disciplinary action administered through the university Honor Code Office, in addition to academic sanctions that may be applied by an instructor.

Inadvertent plagiarism, whereas not in violation of the Honor Code, is nevertheless a form of intellectual carelessness that is unacceptable in the academic community. Plagiarism of any kind is completely contrary to the established practices of higher education, where all members of the university are expected to acknowledge the original intellectual work of others that is included in one's own work.

IT 280: On exams you are required to work from personal memory, using only the resources that are normally present on your computer. This means the exams are closed book and closed notes.

Faculty are responsible to establish and communicate to students their expectations of behavior with respect to academic honesty and student conduct in the course. Observations and reports of academic dishonesty shall be investigated by the instructor, who will determine and take appropriate action, and report to the Honor Code Office the final disposition of any incident of academic dishonesty by completing an Academic Dishonesty Student Violation Report. If the incident of academic dishonesty involves the violation of a public law, e.g., breaking and entering into an office or stealing an examination, the act should also be reported to University Police. If an affected student disagrees with the determination or action and is unable to resolve the matter to the mutual satisfaction of the student and the instructor, the student may have the matter reviewed through the university's grievance process.

8.4 Sexual Harassment

BYUH's policy against sexual harassment complies with federal Title IX of the Education Amendments of 1972 to protect university students from student-

to-student sexual harassment both in and out of the classroom setting. Any incidents of such student-to-student harassment should be reported to either the Director of Human Resources (808-675-3713) or the Honor Code Office (808-675-3531). Allegations of sexual harassment are taken seriously. Upon receiving a report of sexual harassment, the Director of Human Resources will take appropriate action to resolve and correct conditions resulting from individual perceptions or from inappropriate behavior.