

IT 280 – Computer Networking

Course Syllabus and Calendar – Fall 2012

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Brigham Young University–Hawai‘i

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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.

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:** Sep 10 to Dec 14, 2012
- **Class Time:** MWF 12:10 to 1:10 PM
- **Final Exam:** Fri, Dec 14, 1:00–3:50 PM

2.2 Important Website Links

- **Don Colton Home Page (General):**
<http://doncolton.com/>
- **Prof Colton Home Page (BYUH):**
<http://byuh.doncolton.com/>
- **IT 280 Course Home Page:**
<http://byuh.doncolton.com/it280/>
- **Networking 101 Textbook:** PDF
<http://n101.doncolton.com/>
- **My Learning Management System: (Grade Book, Exams, etc.)**
<https://dcquiz.byuh.edu/>

2.3 About the Instructor

- **Instructor (me):** Don Colton
- **My email:** doncolton2@gmail.com
- **My Office:** GCB 128
- **Office Hour:** MWF 10:50–11:20 AM
- **Office Hour:** MWF 1:10–1:40 PM

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

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

Grading is on a standard 60/70/80/90 model using 1000 points, plus a number of bonus points.

Grading is based on 1000 points

930+	A	900-929	A-	870-899	B+
830-869	B	800-829	B-	770-799	C+
730-769	C	700-729	C-	670-699	D+
630-669	D	600-629	D-	0-599	F

<https://dcquiz.byuh.edu/> is my personal Learning Management System. There I maintain an online grade book. You can see how your points are adding up. You can compare your points with other students in the class (without seeing any names).

You earn points for effort (400) and demonstrated skill (600), with some extra credit possible.

4.1 Effort: (64+10) Daily Update

Class each day starts with the “daily update.” It is my way of taking roll, and your way of saying something to the other students and to me. It must be taken during the 15-minute window of time that starts 10 minutes before class and ends 5 minutes into class.

This is worth two points per class period, with 64 points expected (for 32 class periods) and 74 points maximum (for all 37 class periods this semester). It is partly a reward for coming on time, or close enough that you can do the update.

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

4.2 Effort: (336+84) Study Points

By (336+84) we mean there are 336 points of regular credit and 84 points of extra credit in this category.

We award three points per hour of “study.” By study we mean you are engaging with the materials of this course. We expect you to put in a total of about 100 hours of study on this course, with about 40 of those hours being right in class and about 60 of those hours being outside of class.

During Fall, a typical week works out to 3 hours of study in class and 5 to 7 hours outside of class, for a total of 8 to 10 hours. I expect 8. I give you credit for up to 10.

Using 8 hours per week for 14 weeks, that works out to 336 points in this category, or a little more than 1/3 of your total points. You may earn up to 84 additional points (extra credit) in this category during the semester for a maximum of 420 points.

(336) max 420, Time Spent Studying

- 24 max 30, in the week before class on Sep 17
- 24 max 30, in the week before class on Sep 24
- 24 max 30, in the week before class on Oct 1
- 24 max 30, in the week before class on Oct 8
- 24 max 30, in the week before class on Oct 15
- 24 max 30, in the week before class on Oct 22
- 24 max 30, in the week before class on Oct 29
- 24 max 30, in the week before class on Nov 5
- 24 max 30, in the week before class on Nov 12
- 24 max 30, in the week before class on Nov 19
- 24 max 30, in the week before class on Nov 26
- 24 max 30, in the week before class on Dec 3
- 24 max 30, in the week before class on Dec 10
- 24 max 30, in the week of the Final on Dec 14

Reporting Your Study Time

If you do not report in some other way, like via the Daily Update, you can report by sending an email to me.

Normally each Wednesday you should report having studied about three hours in the previous two days. Each Friday you should report having studied about six hours in the previous four days. Each Monday you should report having studied about nine hours in the previous seven days.

I will take the hours you report. I will multiply that by 3.

To get the study points, you must keep a written, contemporaneous (up to date), daily record of the time you studied for this course.

You must earn the points in the week for which they are awarded.

Study time is measured from the scheduled start of the first class each week.

Carry-overs are not allowed unless I give you special permission. This can happen if you have a special circumstance like illness or university-approved travel. Check with me.

We only count time you gave your mostly undivided attention to this course. (Minor interruptions are okay. Big ones stop the clock.)

1. You can count time you attended class (and paid attention; sleeping does not count).
2. You can count time you read / studied any part of any of the text books listed in this syllabus.
3. You can count time you read / studied any part of the readings I provide, including this syllabus, the study guide, and the course web page. This includes following the links in the study guide, which typically lead to Wikipedia pages, and reading what you find there. It also includes following links on the course web page and reading what you find there.
4. You can count time you spent for this class reviewing and practicing exams.
5. You can count time you studied for this class with other students or tutors.

If you think of another category that you think should count, ask me.

4.3 Effort Summary (400+94)

- Effort:
 - Daily Update: 64+10
 - Study Points: 336+84
- Total: 400+94

If you have earned enough points that full credit on all future Effort items would get your overall grade up to an A, and you bring it to my attention, then I will grant those remaining effort points and you will have your A.

4.4 Skill: (340+34) “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 “pretake” and a regular take. The pretake score is granted a 10% bonus.

E1: (40+4) Basics

E2: (80+8) OSI Model

E3: (50+5) Home Networking

E4: (20+2) Wi-Fi

E5: (40+4) Security

E6: (80+8) IPv4

E7: (30+3) Tools

4.5 Skill: (240+50) “S” Exams

SN: (80) q25 Skill Numbers

SS: (80) q50 Skill Subnets

SV: (50) 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 160 points (80 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 about three hours. 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.

4.6 Skill: (100) Labs

L1: (40) Lab 1: Cables

L2: (40) Lab 2: Router Configuration

L3: (20) Lab 3: Wi-Fi Site Survey

4.7 Extra Credit Presentation

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

Sample 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.

Must be ready for presentation by December 1, but I will schedule the actual date of presentation.

4.8 Extra Credit Errors

Report an error in the materials I provide. I always provide a syllabus and a course website. I may provide other materials, such as a textbook, a study guide, and sample tests. Each error reported can earn you extra credit.

4.9 Points Summary (1000+178)

- Effort:
 - Daily Update: 64+10
 - Study Points: 336+84
 - Effort Total: 400+94
- Skill:
 - “E” Tests: 340+34
 - “S” Tests: 160+50
 - Labs: 100
 - Skills Total: 600+84
- Total: 1000+178

With lots of extra credit available, it is common for students to earn 930 points, enough for an A, some time before the final exam.

5 Calendar

Here is what you can learn from the calendar: (a) when the exams are happening, and (b) what to study to maximize the value of your class time.

The exams are fixed in time. They will not change unless there is a fire or a flood or something. Exams happen on some Fridays. They are closed-book,

closed-notes, closed-neighbor, etc. You can bring blank paper. **Some memorization is required.**

The other things will be adjusted as we go through the semester. I reflect my plans in the Daily Update calendar section. The “next few days” should always be a pretty good guide for what you should study.

5.1 Day by Day

Mon Sep 10	37	grading, study time
Wed Sep 12	36	E1 practice
Fri Sep 14	35	E1 Pretake
Mon Sep 17	34	U1 ch 1-4, Basics
Wed Sep 19	33	SN explain, group practice
Fri Sep 21	32	E1 Basics
Mon Sep 24	31	U2 ch 5-9, OSI
Wed Sep 26	30	L1 Build Cables
Fri Sep 28	29	E2 Pretake
Mon Oct 1	28	L1 Build Cables
Wed Oct 3	27	SN group/solo practice
Fri Oct 5	26	E2 OSI, SN
Mon Oct 8	25	U3 ch 10-12, Home Networks
Wed Oct 10	24	L2 Router Reset, Passwords
Fri Oct 12	23	E3 Pretake, SN
Mon Oct 15	22	L2 How Routers Work
Wed Oct 17	21	L2 IPv4, DNS, NAT
Fri Oct 19	20	E3 Home, SN
Mon Oct 22	19	U4 ch 13-14, Wi-Fi
Wed Oct 24	18	L3 Site Survey
Fri Oct 26	17	E4 Pretake, SN
Mon Oct 29	16	Dia
Wed Oct 31		ISECON, No Class
Fri Nov 2		ISECON, No Class
Mon Nov 5	15	U5 ch 15-17, Security
Wed Nov 7	14	L2 Security
Fri Nov 9	13	E4 Wi-Fi, E5 Pretake, SN
Mon Nov 12	12	SS explain, group practice (ch 19)
Wed Nov 14	11	SS group/solo practice (ch 19)
Fri Nov 16	10	E5 Security, E6 Pretake, SS
Mon Nov 19	9	U6 ch 18-20, IPv4
Wed Nov 21	8	SV explain, group practice
Fri Nov 23		Thanksgiving, No Class
Mon Nov 26	7	U7 ch 21, ipconfig, ping, tracert
Wed Nov 28	6	U7 ch 22, nmap, Wireshark
Fri Nov 30	5	E6 IPv4, E7 Pretake
Mon Dec 3	4	Grade Review, SV group/solo prac
Wed Dec 5	3	
Fri Dec 7	2	E7 Tools
Mon Dec 10	1	Review
Fri Dec 14	0	Final Exam, 1 to 4

5.2 Excused Absences

My policy on absences is to build enough slack into the schedule that you can miss a day when ever you need to. Take a friend to the airport? Take your spouse or child to the doctor? Take a field trip for another class? No problem.

Study points can be made up by any form of studying that is allowed. You do not need to be in class to collect those points.

Daily Update points assume that you will be present about 3/4 of the time. If you are present more than that, you get extra credit.

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.

If you have a situation that does not fit inside these guidelines, come and see me as soon as you know about it. For me it is hugely difficult to set up a test for just one student, or to create a whole new test for one student. I prefer to find another way. If we plan ahead, it reduces the difficulties.

6 Support: Tutoring, etc.

6.1 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 networking. But all of the tutors should know which tutors do know about networking, 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. My door is always open.

6.2 Study Groups

You are encouraged to form a study group. For this class, one of the helpful things a study group can do is quiz each other on the exam questions. The questions are mostly memorization, but they create the opportunity for discussion, specifically about what I meant by each question or answer. Discussion is good.

The skills exams are another good topic for a study group. You can ask each other for help on how to do the problems.

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 on time. 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, with possible rare exceptions, I 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.

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

<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.