IT 480 – Computer Network Design
Course Syllabus and Calendar – Fall 2011

Professor Don Colton

Brigham Young University Hawaii

1 Course Overview

1.1 Syllabus is Subject to Change

This course is undergoing changes. It is possible that I will revise one or more major 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.

1.2 Prerequisites

The prerequisite is IT 280, Computer Networking. You should be familiar with basic networking concepts such as the OSI model, protocol data units like packets and frames, tools like ping and traceroute, and the IPv4 addressing structure including subnetting. On the assumption that a refresher might be helpful, the first few weeks of class will be devoted to review of that material (at an accelerated pace).

2 Course Details

- **Course Number:** IT 480
- **Title:** Computer Network Design
- **Course Description:** Networking of computers and configuration of managed networking equipment including switches and routers, with special emphasis on Cisco equipment and protocols. (Prerequisite: IT 280.)
- **Textbook 1:** Networking 101, by Don Colton.
- **Textbook 2:** CCNA, Todd Lammle, 6e
- **Textbook 3:** CCNA 640-802 Net Simulator.
- **Classroom:** GCB 101
- **Class Time:** MWF 8:40 AM to 9:40 AM
- **Class Dates:** Sep 14 to Dec 14, 2011
- **Final Exam:** Thu, Dec 15, 9:00 to 10:50 AM

2.1 Important Website Links

- **Don Colton Home Page (General):** http://doncolton.com/
- **Prof Colton Home Page (BYUH):** http://byuh.doncolton.com/
- **IT 480 Course Home Page:** http://byuh.doncolton.com/it480/
- **Networking 101 Textbook:** PDF http://n101.doncolton.com/
- **IT 480 Grade Book and Exams:** http://dcquiz.byuh.edu/
- **IT 480 Network Labs:** http://dcnetlab.byuh.edu/

2.2 The Instructor

- **Instructor (me):** Don Colton
- **My email:** doncolton2@gmail.com
- **My Office:** GCB 128
- **Office Hour:** MWF 11:00 – 11:30 AM
- **Office Hour:** MWF 3:30 – 4:00 PM

I may digitally record the audio of my lectures some days.

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:

* Correctly identify all subnet characteristics given a few of them.

* Correctly use CISCO IOS commands to configure routers and switches.

(more to be added)

4   Calendar and Grading

This calendar shows my plan for when things will happen and the points that will be assigned. It will be updated as we go through the semester. The first three columns are day of week, month, and day of month.

Column 4 indicates points for tasks, given as a number followed by the letter "p". Column 5 gives a label by which those points will be shown in my grade book, with this general meaning: **U1** means Unit 1, reading in Networking 101 by Don Colton. **E1** means Exam 1, based on Unit 1 in Networking 101. **L1** means Lammle 1, reading Chapter 1 in the CCNA book by Todd Lammle. **N1** means NetLab 1, completing the lab by Don Colton.

There will also be points for doing activities with the Network Simulator by Wendell Odom.

The last column describes the task or activity.

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

Calendar:

W	Sep	14			Intro, Overview
F	Sep	16	10p	N1	Lab: Change Hostname
M	Sep	19	15p	U1	Read: Basics, 27pg
			25p	E1	Exam: Basics
W	Sep	21			Unit 2 discuss
F	Sep	23	15p	U2	Read: OSI, 28pg
			40p	E2	Exam: OSI
M	Sep	26	10p	N2	Lab: Change IP Addr
W	Sep	28			Unit 3 discuss
F	Sep	30	15p	U3	Read: Home, 27pg
			25p	E3	Exam: Home
M	Oct	3			Unit 4 discuss
W	Oct	5	10p	U4	Read: WiFi, 13pg
			10p	E4	Exam: WiFi
F	Oct	7			Unit 5 discuss
M	Oct	10	15p	U5	Read: Security, 29pg
			20p	E5	Exam: Security
W	Oct	12			Unit 6 discuss
F	Oct	14	20p	U6	Read: IPv4, 36pg

			20p	E6	Exam: IPv4
M	Oct	17			Unit 7 discuss
W	Oct	19	15p	U7	Read: Tools, 29pg
			20p	E7	Exam: Tools
F	Oct	21			IPv4 Calc discuss
M	Oct	24	40p	E8	Exam: IPv4 Calc
W	Oct	26	25p	L1	Read: Internetworking, 66pg
F	Oct	28	15p	L2	Read: TCP/IP, 44pg
M	Oct	31	20p	L3	Read: Subnetting, 60pg
W	Nov	2	30p	L4	Read: CISCO IOS, 80pg
F	Nov	4			No Class: ISECON
M	Nov	7	20p	N3	Lab: Recover Password
W	Nov	9	25p	L5	Read: Managing Cisco, 76pg
F	Nov	11	20p	N4	Lab: Router, 1 Switch
M	Nov	14	30p	L6	Read: IP Routing, 90pg
W	Nov	16	20p	N5	Lab: Router, 2 Switches
F	Nov	18	20p	N6	Lab: 2 Router, RIPv2
M	Nov	21	25p	L7	Read: EIGRP, OSPF, 76pg
W	Nov	23	20p	N7	Lab: 2 Router EIGRP
F	Nov	25			No Class: Thanksgiving
M	Nov	28	20p	L8	Read: Switching, STP, 58pg
W	Nov	30	20p	L9	Read: VLANs, 58pg
F	Dec	2	20p	LA	Read: Security, 60pg
M	Dec	5	10p	LB	Read: NAT, 34pg
W	Dec	7	5p	LC	Skim: Wireless, 36pg
F	Dec	9	5p	LD	Skim: IPv6, 36pg
M	Dec	12	10p	LE	Skim: WANs, 78pg
W	Dec	14			
Th	Dec	15			**Final Exam** 9:00-10:50 AM

5   Objective

The main objective for this course is to prepare you to function as a network administrator for an organization with many computers, switches, routers, and other network equipment. We will strive to achieve a level of learning that would prepare you to pass the Cisco(R) Certified Network Associate (CCNA(R)) Examination.

There are three certifications that I hear a lot about. CCNA is one of them. The other two are A+ and MCSE. There are other certifications that I don't hear much about. CCNA is one of the major certifications that employers will recognize by name.

I earned my CCNA certification on Sep 8, 2010. My score was 860 out of 1000. The score required to pass was 825. Before taking the exam, I studied extensively for about three weeks including reading about half of the textbook we are using and taking

numerous practice tests. I also prepared over the past years by having an active interest in networking, teaching the introductory networking course here at BYUH, and team-teaching this CCNA course three years ago. (I was the junior instructor. My son Joseph was the senior instructor. I was mostly just along for the ride and to learn what I could. He did the heavy lifting.)

I believe that you too can earn your CCNA by the end of this semester. To do so will require more than three credits worth of work on your part. If you put in the nominal three credits of effort we all know and love, you will not pass the CCNA, but you will still be able to get a good grade in the class. If you want to take the CCNA later, there may be a chance for you to take another IT class like IT 495 where you can earn credits for the time and effort you put into it.

6 Textbook

There are three textbooks.

6.1 Networking 101

The first is one I wrote for the IT 280 class. We will cover it during the first few weeks of class by way of background material. You should know and understand all the important concepts that it contains.

Fortunately it is free.

6.2 Lammle, 6e

The second textbook I have selected is "**CCNA, Cisco Certified Network Associate**" by Todd Lammle (pronounced lamb-lee). We will use the sixth edition, copyright 2007. The publisher is Sybex. The ISBN-13 number is: **978-0-470-11008-9**. The book is available on Amazon (2011) for right around $27. (In 2010 it was $32.)

The book was updated in 2007 to keep pace with the changing CCNA exam. As networking develops and improves, some older skills are not needed as much and other newer skills take their place. For example, Wi-Fi has become a much bigger deal in the past five years and it is covered in 6e better than in previous editions.

If you do not have 6e at this time, you should order it. In the mean time, you can survive with an older copy for the first few weeks. Older copies should be available for free or really cheap.

There are two main textbooks in this market. We are using Lammle. The other one is by Wendell Odom who writes for Cisco Press. Odom has a good reputation for highly reliable and carefully written material. Lammle has a good reputation for making things understandable. Pick your poison. I decided on Lammle because I think most of us need understandable at this point, and can fine tune our understanding later. You may find parts of Lammle where he has simplified a concept so much that it is no longer totally accurate. Live with it, I guess.

6.3 Network Simulator

The third textbook I have selected is "**CCNA 640-802 Network Simulator, Academic Edition**" by Wendell Odom and Jeffrey S. Beasley. We will use the first edition, copyright 2011. The publisher is Pearson. The ISBN-10 is 1-58720-433-9. The ISBN-13 is **978-1-58720-433-3**. The List Price is $160, but I found it online at http://bookdepository.com/ for $109.

For that you get a CD-ROM and a single-user license. So don't buy a used copy in case the activation codes have already been used.

This is the first year I am trying this out. It promises to be an excellent tool for helping students really master the hands-on aspects of Cisco network design.

I am betting that this one is a "keeper" that you will benefit from greatly as you prepare to take the CCNA exam.

6.4 CCNA Practice Exam

Cisco offers a practice exam for about $80. I bought it and have used it extensively to prepare for the real exam. I recommend it, but I think the lab simulator might be just as valuable.

6.5 CCNA Exam

Okay, this is not really a textbook. But you might as well know what you are up against.

The exam comes in two flavors. The one-sitting version costs $250 the last I checked, and covers everything all at once. That's the version that I passed, but none of the students have passed it yet.

The two-sitting version costs $125 for each half. I recommend students take the first half, and if they pass it, then take the second half. That way you have less money at risk.

7 Grading

If you have a CCNA by the end of the course, that will get you an A. Nobody will meet that goal. Well, I hope somebody will, but having taken the test myself, I have to tell you that you don't pass it by accident.

As a substitute, I am putting together tests and labs that will evaluate the key skills you would need to pass the CCNA. I will assign some number of points for each skill. I will test you.

Grading will be based on 1000 points. I may end up adjusting the brackets to be more generous. We will have to wait and see. In the mean time, just do your best.

About 300 points are from activities related to the Networking 101 textbook. About 300 points are from activities related to the Lammle textbook. About 400 points are from the NetLab experiences and the Network Simulator experiences.

Reading: You are assigned to read certain chapters of the textbooks. Each assignment has a deadline. You will be asked whether you read the chapters by the deadlines. If you say yes, you get the reading points. (Strictly speaking, there is no need to understand the material to earn the reading points, but understanding would be definitely useful.)

Skimming: There are a few chapters that are assigned as "skim." This means that you look through the chapter with about half as much attention as if you were actually reading.

There are seven readings based on the seven units of the Networking 101 textbook. They are worth about 1 point per 2 pages, but each one is an all-or-nothing score: you get all the points for the unit, or none of the points.

There are 14 readings based on the 14 chapters of the Lammle textbook. They are work about 1 point per 3 pages, but each one is an all-or-nothing score: you get all the points for the chapter, or none of the points.

Exams: There are eight exams based on the Networking 101 textbook. Points are based on the raw points for questions answered correctly.

Labs: There are seven NetLab experiences. Each one is an all-or-nothing score: you get all the points for the lab, or none of the points.

8 BYUH Learning Framework

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

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 yours and others understanding of the material.

In IT 480: 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 than lectures.

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 480: Participate in the in-class activities. Those that finish first are requested to help those what want assistance.

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 480: After each exam, review your answers and those of other students. See how your answers could be improved. If you feel lost, read the readings again.

9 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.

9.1 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.

9.2 Accommodating 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, 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.

9.3 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.

In this course group work is permitted and encouraged but you are not allowed to turn in work that is beyond your understanding, whether you give proper attribution or not. Make sure you understand what you are submitting and why each line is there.

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. However, you are nearly always allowed (and encouraged!) to test your program by actually running it on the computer where you are sitting. Students caught cheating on the final exam may receive a grade of F

for the semester, no matter how many points they may have earned, and they will be reported to the Honor Code office.

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.

9.4   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 (675-3713) or the Honor Code Office (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.