

CIS 205 – Discrete Mathematics I

Course Syllabus and Calendar – Fall 2014

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Brigham Young University–Hawai‘i (BYUH)

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Certain content is required in all BYUH syllabi. Section 9 gives a convenient summary of that content.

Students may find sections 1 through 4 to be immediately beneficial as they seek to understand this class and the manner in which it will be conducted. Read those first. The remaining sections give additional depth and breadth.

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1 Overview

Programming is the art of building up those simple things that computers can do into those fun but complicated things we want them to do.

Part of this involves certain “tricks of the trade,” so to speak. Much as the human body has to fire certain nerve cells in order to make an arm pick up a pencil, the computer has to carry out certain primitive instructions to make the desired result happen.

The linkage between nerves firing and arms moving may not always be obvious.

The good news is that those “tricks of the trade” are kind of fun to learn and use. The scary part is they were discovered and developed by mathematicians originally, so they are considered to be a branch of Mathematics. But really, they belong to Computer Scientists. Like us.

Discrete Mathematics 1 introduces many of the underlying mathematical principles used by computer scientists. While the usefulness may not always be immediately apparent, these concepts will be integral to our understanding of the principles of computing. Where possible, we will discuss the immediate application.

Although the word Mathematics is in the course title, this is basically a computer science course. Mathematical concepts are the focus of study, but they are reinforced through programming projects and exams. Other activities may also be assigned to support those concepts that are not otherwise adequately reinforced or measured.

1.1 So, What *is* Discrete Math?

Discrete means chunks, as opposed to Calculus, which is continuous.

With discrete, we are dealing with things like the natural numbers: 1, 2, 3, 4, 5, and so on. We are not dealing with things like $\pi = 3.1415\dots$ and $e =$

2.71828... and natural logarithms.

So, it's whole things. Things that are either totally present or totally absent. Ones and zeros. True and false. Six sides on dice. Two sides on coins. Branches in trees. Nodes and edges in graphs.

It's kind of fun. Like solving a puzzle.

1.2 Expected Proficiencies

I expect that you can already program in a language that I support for this class. The supported languages are: C, C++, Java, Perl, Python, Ruby, and Tcl. If you only know another language, such as Visual Basic, that will be helpful, but you will need to learn one of the supported languages well enough to do your assignments for this class.

You should already be able to use variables, arrays, decisions, and loops. Ideally you should be able to use subroutines. And if you have done recursion already, that would be truly awesome.

If you pass CIS 101 at BYUH with a grade of C or better, you probably have the required level of programming skill.

2 Course and Faculty

2.1 Course Information

- **Title:** Discrete Mathematics I
- **Course Number:** CIS 205
- **Course Description:** (from the catalog) Functions, relations, and sets; basic logic; proof techniques; basics of counting.
- **Prerequisites:** CIS 101
- **Semester/Year:** Fall 2014
- **Semester Code:** 2145
- **Meeting Time:** MWF 08:40 to 09:40
- **Location:** GCB 140
- **First Day of Instruction:** Mon, Sep 08
- **Last Day to Withdraw:** Fri, Oct 31
- **Last Day for Late Work:** Mon, Dec 08
- **Last Day of Instruction:** Mon, Dec 08
- **Final Exam:** Wed, Dec 10, 07:00 to 09:50

2.2 Faculty Information

- **Instructor:** Don Colton

- **Office Location:** GCB 128
- **Office Hours:** MWF 14:30 to 15:30, GCB 111
- **Email:** doncolton2@gmail.com
- **Campus Homepage:**
<http://byuh.doncolton.com/> is my campus homepage. It has my calendar and links to the homepages for each of my classes.
- **Off-Campus Homepage:**
<http://doncolton.com/> is my off-campus homepage.

I have reserved GCB 111 on MWF 14:30 to 15:30 so my CIS 205 students (and others) can study in a lab setting and meet with me and each other. I allow the room as an Open Lab for your use either individually or in groups, for my class or for other classes. MWF 14:30 to 15:30 I will be present in GCB 111 or in my office to assist students that come.

2.3 Course Readings and Materials

- **Textbook (Rental):** Mathematical Structures for Computer Science (6th Edition), by Judith L. Gersting. ISBN 071676864X.
- **Learning Management System:**
<https://dcquiz.byuh.edu/> is the learning management system for my courses.
- **Course Homepage:**
<http://byuh.doncolton.com/cis205/> is my course homepage. It has links to many things including the syllabus, study guide, and textbook.
- **Study Guide:**
<http://byuh.doncolton.com/cis205/2145/sguide.pdf> is the study guide for this course. It includes an indexed copy of some or all of this syllabus. The study guide is updated frequently throughout the semester as assignments are made and deadlines are established or updated.

3 Calendar

Mo Sep 08 syllabus, **p01** (20p) Factors
 We Sep 10 **p02** (20p) Perfect Numbers
 Fr Sep 12 textbooks, formal logic
 Mo Sep 15 G1.1 (001-013) Symb, Taut; Guilty
 We Sep 17 G1.2 (021-031) Propositional Logic
 Fr Sep 19 **S1v1** q41 Prop Calc (40m)
 Mo Sep 22 G2.1 (088-098) Proofs, **p03** (30p)
 We Sep 24 G2.2 (100-112) Induc, **p04** (20p)

Fr Sep 26 **S1v2** q41 Prop Calc (40m)
 Mo Sep 29 G2.3 (118-123) Proof of Correctness
 We Oct 01 **S2v1** Big Oh Analysis (30m)
 Fr Oct 03 **S2v2** Big Oh Analysis (30m)
 Mo Oct 06 G2.4 (129-140) Recursive Defs
 We Oct 08 **S3v1** Counting (30m)
 Fr Oct 10 **S3v2** Counting (30m)
 Mo Oct 13 G3.1 (186-201) Sets, **p05** (20p) Fac
 We Oct 15 G3.2 (211-219) Cnt, **p11** (20p) Mult
 Fr Oct 17 **S4v1** Conditional Probability (50m)
 Mo Oct 20 G3.3 (225-231) Pigeon, **p13** (20p)
 We Oct 22 G3.4 (233-246) Perm, **p14** (25p)
 Fr Oct 24 **S4v2** Conditional Probability (50m)
 Mo Oct 27 G3.5 (252-261) Cond P, **p15** (25p)
 We Oct 29 G4.1 (285-301) Relations
 Fr Oct 31 **S5v1** Binary Search Trees (50m)
 Mo Nov 03 G5.1 (401-422) Graphs, **p21** (50p)
 We Nov 05 G5.2 (433-444) Trees
 Fr Nov 07 **S5v2** Binary Search Trees (50m)
 Mo Nov 10 G5.3 (451-458) Decision Trees
 We Nov 12 G5.4 (462-469) Huffman, **p22** (50p)
 Fr Nov 14 **S6v1** Huffman (50m)
 Mo Nov 17 G6.1 (475-487) Directed Graphs
 We Nov 19 G6.2 (490-496) Euler, Hamiltonian
 Fr Nov 21 **S6v2** Huffman (50m)
 Mo Nov 24 G6.3 (499-507) Shortest Path, MST
 We Nov 26 G6.4 (513-521) Traversal: BFS, DFS
 Fr Nov 28 ** No Class: Thanksgiving Friday
 Mo Dec 01 **S7v1** MST (50m)
 We Dec 03
 Fr Dec 05 **S7v2** MST (50m)
 Mo Dec 08
 We Dec 10 ** Final Exam, 07:00 to 09:50

- Study Time 80 (max 84)
- Programming 300
- Exams 400

4.1 Tracking Your Grade

I keep an online grade book so you can see how your points are coming along. It also lets you compare yourself 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.

2145 CIS 205 Overall Grade Book: This includes the totals from all the other grade books. This is where you can find your final grade at the end of the course.

2145 CIS 205 Daily Update Grade Book

2145 CIS 205 Daily Quiz Grade Book

2145 CIS 205 RST Grade Book: This tracks readings and study time.

2145 CIS 205 Activities Grade Book: This tracks your performance on programming activities.

2145 CIS 205 Exam Grade Book: This tracks your performance on exams.

4.2 Daily Update (35 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 at a classroom computer during a window of time that starts a few minutes before class and ends 5 minutes into class.

Tardiness: My tardiness policy is that you should arrive in time to complete the daily update. Generally if you are only four minutes late or less, you will have time to complete the daily update before the deadline.

The DU is worth one point per class period, with 35 points expected (for 35 hours out of 39 class periods).

Attendance: My attendance policy is that you will attend at least 35 hours during the course. Anything

4 Grading

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

The points are divided up as follows.

- Daily Update 35 (max 39)
- Daily Quiz 85 (max 90)
- Readings 100

beyond 35 points 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, when readings are due I will ask you whether you read the assigned pages. I will use your report to update your readings points.

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. See “Study Time” below for information.

4.3 Daily Quiz (85 points)

Right after prayer on many days there will be a short quiz (about a minute). It will typically consist of one or more questions that are based on the assigned readings in the text book.

4.4 Readings (100 points)

Mo Sep 15 G1.1 (001-013) 5p
 We Sep 17 G1.2 (021-031) 5p
 Mo Sep 22 G2.1 (088-098) 5p
 We Sep 24 G2.2 (100-112) 6p
 Mo Sep 29 G2.3 (118-123) 3p
 Mo Oct 06 G2.4 (129-140) 5p
 Mo Oct 13 G3.1 (186-201) 7p
 We Oct 15 G3.2 (211-219) 4p
 Mo Oct 20 G3.3 (225-231) 3p
 We Oct 22 G3.4 (233-246) 6p
 Mo Oct 27 G3.5 (252-261) 4p
 We Oct 29 G4.1 (285-301) 8p
 Mo Nov 03 G5.1 (401-422) 9p
 We Nov 05 G5.2 (433-444) 5p
 Mo Nov 10 G5.3 (451-458) 4p
 We Nov 12 G5.4 (462-469) 4p
 Mo Nov 17 G6.1 (475-487) 6p
 We Nov 19 G6.2 (490-496) 3p
 Mo Nov 24 G6.3 (499-507) 4p
 We Nov 26 G6.4 (513-521) 4p

Readings should be completed before class on the day assigned. They are listed here as items of the form Gx.y where G means the Gersting textbook, x is the chapter, and y is the section.

When reading each section, read through the “Main Ideas” summary in the “Review” section at the end of each section. You do not have to read the Exercises, but you may if you like. When reading section

1, also read the chapter introduction.

Readings should prepare you for the learning activities of the day. Do your best to understand the readings, but please read them even if you do not understand things fully. Then ask questions.

We award points for doing the readings, which means reading every word of the narrative portions assigned, and looking over the programs that are presented. The expectation is not 100% comprehension, but is 100% familiarity and as much comprehension as you can reasonably gain by normal reading. This provides a basis for in-class activities.

Readings are worth full credit if completed before class on the date they are due, and are worth half credit (rounded up) if completed within the week after the due date.

Credit is based on an all-or-nothing statement by the student in response to the question: Did you complete all of the assigned readings?

Time you spend doing the readings also counts as study time.

4.5 Study Time (80 points)

Keep a written daily log of the time you spend studying. We award points for study time (ST), which is time spent outside of class engaging with materials directly related to this course.

Each week you are invited to report, on your honor, how many hours outside of class you studied during the previous week, Sunday morning through Saturday night. We award one point per hour of “study,” for a total of 6 points per week, whether there is a holiday or not.

There are 14 weeks. $14 \times 6 = 84$. Points beyond 80 are extra credit.

Carry Forward: If you study more hours than the maximum 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, if 6 hours is the maximum that counts and you studied 15 hours, you can report 15 hours of study, and I would count the first 6 hours. You would then take the remaining 9 hours and count it toward the following week.

There is no Carry Backward.

Most students max out the study time points each week.

4.6 Some Points are Optional

The readings and study time points are partly there as a safety net. They are meant to be easy to earn. They help to make sure you will pass the class.

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

- (a) Counting every point, based on 1000 total points.
- (b) Counting all but readings and study time, based on 820 total points.

I grade several 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.

4.7 Skill: (300 points) GradeBot

Mo Sep 08	p01	(20p)	Factors
We Sep 10	p02	(20p)	Perfect Numbers
Mo Sep 22	p03	(30p)	Fibonacci
We Sep 24	p04	(20p)	Greatest Common Div
Mo Oct 13	p05	(20p)	Prime Factors
We Oct 15	p11	(20p)	Multiplication Rule
Mo Oct 20	p13	(20p)	OSWOR
We Oct 22	p14	(25p)	Choose
Mo Oct 27	p15	(25p)	OWII
Mo Nov 03	p21	(50p)	Binary Search Tree
We Nov 12	p22	(50p)	Huffman Coding

During the semester we will do several computer programs. Supported languages include Perl, which is taught in the CIS 101 class, as well as C, C++, Java, Python, Ruby, and Tcl.

<http://gbot.is2.byuh.edu/> has more.

Each programming assignment has its own section in the study guide where the task is described and deadlines are given. The study guide will be updated as needed throughout the semester.

GradeBot (aka GradeBot Lite, aka GBot) will accept your program and test it. When it finds an error, it will inform you so you can fix it. When it runs all its tests without finding any errors, it will inform you so you can turn it in to me. (GradeBot does not turn it in.)

Time you spend working on these programs also counts as study time.

Assignments are correct when they work properly and comply with all of the stated requirements in the study guide. Commonly that includes algorithm and style. Points are assigned according to the date on which the correct work is received. Details are provided in the study guide, but in general it works like this:

Full Credit: Correct by 23:59 the day it was due.

Penalty (-5pt): Each class day it is late.

4.8 Do Your Own Work

Help each other, but do your own work.

These two goals are in conflict with each other. To resolve this conflict, I draw the line at copying.

Except during exams, you are strongly encouraged to work with your fellow students. We want everyone to get full credit on every assignment. Please help each other learn.

If You are Looking at Someone's Program:

You **may**: look, read, make mental notes, ask questions, point out possible errors, and try to understand.

You **must not**: fix their program, take written notes, take pictures, take a copy of all or part of their program.

If Someone is Looking at Your Program:

You **may**: explain your approach, ask for help.

You **must not**: let them fix your program, give them a copy of all or part of your program.

This includes working with tutors or students who took the class in previous semesters.

What Cheating Looks Like:

If 100 people in this class try to write the same program, parts of it will be identical. The overall flow of the program will likely be the same. Sometimes variable names will actually be the same.

But often people do a few random quirky things. They may have lines of code that do not hurt, but do not really help either.

I tend to notice those quirky things. When two or

more students have the same quirks, that is evidence of cheating.

If I “call you out” on what looks like copying, your job will be to explain to me why you put those lines in your program. What is their purpose?

4.9 Skill: Exams (400 pts + 35 ec)

Fr Sep 19 **S1** (60 pts + 6 ec)
 Fr Sep 26 **S1** second try
 We Oct 01 **S2** (50 pts + 5 ec)
 Fr Oct 03 **S2** second try
 We Oct 08 **S3** (50 pts)
 Fr Oct 10 **S3** second try
 Fr Oct 17 **S4** (60 pts + 6 ec)
 Fr Oct 24 **S4** second try
 Fr Oct 31 **S5** (60 pts + 6 ec)
 Fr Nov 07 **S5** second try
 Fr Nov 14 **S6** (60 pts + 6 ec)
 Fr Nov 21 **S6** second try
 Mo Dec 01 **S7** (60 pts + 6 ec)
 Fr Dec 05 **S7** second try
 We Dec 10 third try at anything

Each exam has its own chapter in the study guide where it is explained.

During the semester we will do in class seven “skills” exams that test your skill with certain concepts and procedures. Each exam will be available for practice, and will be given twice for credit. On the final exam day, each exam will be available again to let you try to improve your grade.

Most of the exams are designed on an 80/30 model, where the first 80% of the questions are of normal difficulty, and the last 30% of the questions are somewhat harder. Yes, that adds up to 110%. The other 10% is extra credit for those that can do it.

4.10 Other Extra Credit

Report an error in my formal communications (the published materials I provide), so I can fix it. In this class, the materials include the following:

- The course website, parts relating to this semester.
- The course syllabus.
- The course study guide.

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

Syllabus errors (unless they are major) will probably be fixed only in the study guide. Check there before reporting it.

5 Instructional Methods

Exams happen on scheduled exam days. Exams are an instructional method that brings you, the student, face to face with the challenges you need to be able to solve.

Lecture days happen occasionally. I review material that was assigned from the text book and do what I can to make it clear and interesting. These can take up most of the class hour, and happen more often at the start of the course than they do later on.

Activity days are usually the most common. A learning activity is assigned. Typically it is a program to be written. The program will be described in the study guide. I will give an overview of the problem and the techniques that I think will be helpful to solve it. Typically this takes about 15 minutes, but the actual time varies widely. Then I sit down at the front of the room and invite students to visit with me, one on one, for assistance. Students are also encouraged to help each other.

Help in Class: As students come to visit with me, I call up their computer screen from the place they were sitting, and we look at their program code or whatever else the student is asking about. We review the situation together. The student then returns to work on their program at their seat and I work with the next student waiting in line.

I want to help as many students as I can. You can help by doing these kinds of things before coming up.

(a) Have my study guide available on your desktop, turned to the relevant assignment so we can review the requirements.

(b) If it is a question about grades, have my grade-book available on your desktop.

(c) If it is about an exam question, have that exam available on your desktop.

5.1 BYUH Learning Framework

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

5.1.1 Prepare for CIS 205

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 CIS 205: Make reading part of your study. 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 a general lecture.

5.1.2 Engage in CIS 205

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 CIS 205: Participate in the in-class activities. Those that finish first are encouraged to help those that want assistance. It is amazing what you can learn by trying to help someone else.

5.1.3 Improve at CIS 205

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 CIS 205: After each exam, I normally allow you to see every answer submitted, every score given, and every comment I wrote, for every question. Review your answers and those of other students. See how your answers could be improved. If you feel lost, study the readings again or ask for help.

5.2 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.

5.2.1 Office Hour / Open Lab

I have reserved GCB 111 on MWF 14:30 to 15:30 so my CIS 205 students (and others) can study in a lab setting and meet with me and each other. I allow the room as an Open Lab for your use either individually or in groups, for my class or for other classes. MWF 14:30 to 15:30 I will be present in GCB 111 or in my office to assist students that come.

5.2.2 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.

See section 4.8 for some rules.

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.

5.2.3 Tutoring

The CIS department provides tutoring in GCB 111, Monday through Friday, typically starting around 17:00 and ending around 23:00 (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.

The best way to work with a tutor is to show them

something that you have written and ask them why it does not work the way you want. This can open the door to a helpful conversation.

Another good way to work with a tutor is to show them something in the textbook and ask about it.

The worst way to work with a tutor is to plunk down next to them and say, “I don’t understand. Can you teach me?” If you did not try hard to read carefully, you are wasting everybody’s time.

6 Course Policies

Subject to Change: 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.

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

6.1 Excused Absences

There are many good reasons why students request special treatment. Instead of dealing with these as they arise, based on my years of experience, I have adopted general policies that are intended to accommodate all but the most difficult cases.

6.2 Reasonable Accommodation

This section covers special needs, including qualified special needs, as well as all other requests for special treatment.

I have carefully designed each of my classes to provide reasonable accommodation to those with special needs. Beyond that, further accommodation is usually considered to be unreasonable and only happens in extreme cases. Please see the paragraph on “Accommodating Special Needs” below for more information.

Ample Time: Specifically, I allow ample time on

tests so that a well-prepared student can typically finish each test in half of the time allowed. This gives everyone essentially double the amount of time that should normally be needed.

Exam Retakes: I allow each test to be taken three (or more) times, and I keep the highest score that was earned. This handles the case of persons that are unable to attend class or function at their best on any given day. I consider the first attempt to be routine and the second and third attempts to be an accommodation for anyone that might need it. The scheduled final exam time consists of that third opportunity to retake **any** exam that was offered during the semester. If you are happy enough with your previous scores, **you can probably skip the final.**

As a side effect of this three-tries approach to exams, it is also true that any student can miss any one or two days of class for any reason without messing up their grade.

On the other hand, the retakes are limited. If you have issues every single time a certain test is given, I do draw the line, and I will not give additional chances. Additional retakes are not considered to be a “reasonable” accommodation.

Specifically, if you tend to miss class a lot because you do not wake up early enough, you will probably fail the class, even if you have a legitimate medical reason. It goes beyond reasonable accommodation.

Extra Credit: I have built about 10% of slack into the grading so you can miss a few points here or there and make them up elsewhere.

Deadlines: Most assignments are due soon after they are discussed, but I normally allow late work at full credit for several more weeks (except at the end of semester).

Even though I truly believe that these methods provide reasonable accommodation for almost everyone in almost every case, you might have a highly unusual situation for which I can and should do even more. You are welcome to see me about your situation.

6.3 Communication

We communicate with each other both formally and informally.

Formal communication tends to be written and precise. Formal is for anything truly important, like grades. Formal is authoritative.

Informal communication tends to be more casual and impromptu. Informal is meant to be helpful and efficient. Reminders are informal. Emails are informal. Explanations are usually informal.

6.3.1 Me to You, Formal

I communicate formally, in writing, through (a) the syllabus, (b) the study guide, and (c) the learning management system.

(a) Syllabus: <http://byuh.doncolton.com/cis205/2145/syl.pdf> is the syllabus for this course. It tells our learning objectives and how you will be graded overall. You can rely on the syllabus. After class begins, it is almost never changed except to fix major errors.

(b) Study Guide: <http://byuh.doncolton.com/cis205/2145/sguide.pdf> is the study guide for this course. It includes a copy of the syllabus. The study guide is updated frequently throughout the semester, as assignments are made and deadlines are established or updated.

(b1) Calendar: The study guide tells when things will happen. It contains specific due dates.

(b2) Assignments: The study guide tells what assignments have been made and how you will be graded, item by item. It provides current details and specific helps for each assignment. It provides guidance for taking the exams.

(c) DCQuiz: <https://dcquiz.byuh.edu/> is my learning management system. I use it to give tests. I use it to show you my grade books.

6.3.2 Me to You, Informal

My main informal channels to you are (a) word of mouth and (b) email.

(a) Word of Mouth, including Lecture: Class time is meant to be informative and helpful. But if I say anything truly crucial, I will also put it into the study guide.

(b) Email: My emails to you are meant to be helpful. But if I say anything truly crucial, I will also put it into the study guide. Normally I put CIS 205

at the front of the subject line in each email I send.

6.3.3 You to Me, Formal

Your formal channels to me, specifically how you turn in class work, are mainly via (a) the learning management system, (b) email, and (c) specifically requested projects.

(a) DCQuiz: To use my learning management system, you must log into it. Then, you can respond to questions I have posted. Each day there will be a “daily update”. I say more on that below. Exams will also be given using DCQuiz.

(b) Email: You will use formal email messages to submit some of the programs you write and to tell me certain other things. The study guide tells how to send formal emails, including where to send them, what subject line to use, and what to put in the body of the message.

(c) Student Projects: The study guide may tell you to submit certain work in the form of a webpage or web-based program. If so, it will say specifically where to put it. I will go to that spot to grade it.

6.3.4 You to Me, Informal

Your informal channels to me, typically how you ask questions and get assistance, are mainly face to face and by email or chat.

Face to Face: If you need help with your class work, I am happy to look at it and offer assistance. Often this happens during class or during office hours. Often I will have you put your work on your computer screen, and then I will take a look at it while we talk face to face.

Email / Chat: You can also get assistance by sending me an email or doing a chat. I will do my best to respond to it in a reasonable and helpful way. If you want something formal, use the formal rules.

If you are writing about several different things you will usually get a faster response if you break it up into several smaller emails instead of one big email. I try to respond to a whole email at once, and not just part of it. I usually answer smaller and simpler emails faster than big ones.

7 Learning Outcomes

Outcomes (sometimes called objectives) are stated at several levels: Institutional (ILO), Program (PLO), and Course (CLO). In this section we set forward these outcomes and tell how they are aligned with one another.

7.1 ILOs: Institutional Outcomes

ILO: Institutional Learning Outcomes (ILOs) summarize the goals and outcomes for all graduates of BYUH.

Brigham Young University Institutional Learning Objectives (ILOs) Revised 24 February 2014

Graduates of Brigham Young University–Hawai‘i (BYUH) will:

Knowledge: Have a breadth of knowledge typically gained through general education and religious educations, and will have a depth of knowledge in their particular discipline.

Inquiry: Demonstrate information literacy and critical thinking to understand, use, and evaluate evidence and sources.

Analysis: Use critical thinking to analyze arguments, solve problems, and reason quantitatively.

Communication: Communicate effectively in both written and oral form, with integrity, good logic, and appropriate evidence.

Integrity: Integrate spiritual and secular learning and behave ethically.

Stewardship: Use knowledge, reasoning, and research to take responsibility for and make wise decisions about the use of resources.

Service: Use knowledge, reasoning, and research to solve problems and serve others.

7.2 PLOs: Program Outcomes

PLO: Program Learning Outcomes (PLOs) summarize the goals and outcomes for graduates in programs for which this course is a requirement or an elective. These support the ILOs, but are more specific.

At the end of this section, we include the relevant

page from the CIS Program Outcomes Matrix, dated April 2011.

The following outcomes are pursued at the “Introduced” level, and apply to one or more of the majors that use this course.

(a) An ability to apply knowledge of computing and mathematics appropriate to the discipline.

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

CS (j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design choices.

CS (k) An ability to apply design and development principles in the construction of software systems of varying complexity.

7.3 CLOs: Course Outcomes

CLO: Course Learning Outcomes (CLOs, also called Student Learning Outcomes, or SLOs) summarize the goals and outcomes for students who successfully complete this course. These support the PLOs, but are more specific.

Course Goals and Student Learning Outcomes are that by the conclusion of this course, students will understand:

- Formal Logic. (We learn modus ponens, modus tollens, and resolution. There is an exam.)
- Recursion and Memoization. (We write a recursive Fibonacci program that relies on memoization to save time.)
- Proofs and Induction. (We discuss proofs and how they relate to formal logic.)
- Big Oh Analysis. (We do simple big-oh analysis, no recursion. There is an exam.)
- Set Theory. (We do union, intersection, and counting. There is an exam on counting.)

- Conditional Probability. (Given certain probabilities, calculate related probabilities. There is an exam.)
- Functions and Relations. (We talk about it.)
- Graphs and Trees and Recursion. (We learn to construct binary search trees. We learn to traverse trees depth first and breadth first. Recursion is explained. There is an exam.)
- Decision Trees. (We learn to do Huffman coding. There is an exam.)
- Euler Path and Hamiltonian Circuit. (We discuss them. We show EP is easily solvable, and HC is really hard.)
- Minimum Spanning Trees. (We learn how. There is an exam.)

These support and roughly correspond to the following higher-level outcomes.

- Demonstrate the ability to understand and apply knowledge appropriate for Computer Science.
- Understand and be able to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

8 General Topics

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 Academic Integrity

8.1.1 Applicable Actions

<http://honorcode.byuh.edu/> details the university honor code. In the section entitled “Applicable Actions” the following are listed.

Examples of possible actions include but are not limited to the following, for instructors, programs, departments, and colleges:

- Reprimanding the student orally or in writing.
- Requiring work affected by the academic dishonesty to be redone.
- Administering a lower or failing grade on the affected assignment, test, or course.
- Removing the student from the course.
- Recommending probation, suspension, or dismissal.

Depending on the specifics of the offense, any of these responses may be possible.

Cheating on exams is one form of dishonesty that I encounter. Normally this happens when students bring in notes that include answers to past exam questions. I approve the studying of past exams, and bringing in of “memories” based on study, but not the access to written notes, including notes retrieved from other exams or stored on cell phones or other devices. Any such activity, if caught, can result in failure of the entire course.

Cheating on activities also happens. Copy and paste is not allowed, but is sometimes difficult to prove. You should understand the work you submit because it helps you prepare for the exams.

8.1.2 Plagiarism

We learn by watching others and then doing something similar.

Plagiarism: 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.

Do not simply copy. Do your own work. When I review computer code, sometimes I see quirky ways of doing things. They appear to work even though they may be wrong. And then I see someone else that has done it exactly the same wrong way. This does not feel like “doing your own work.” Cut and paste is pretty much an honor code violation. Read and learn is totally okay. Copying other ideas is okay. I don’t want to see any cut and paste.

CIS 205: In this course study groups are permitted and encouraged. See section 4.8 for rules.

You must write your own programs. You can look at what other people have done, and you can show other people what you have done, but you are for-

bidden to copy it. Look at it, yes. Understand it, yes. Ask about it, yes. Explain it, yes. Copy it, no.

CIS 205: 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. Students caught cheating on an 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.

8.2 Sexual Misconduct

Sexual Harassment is unwelcome speech or conduct of a sexual nature and includes unwelcome sexual advances, requests for sexual favors, and other verbal, nonverbal, or physical conduct. Conduct is unwelcome if the individual toward whom it is directed did not request or invite it and regarded the conduct as undesirable or offensive.

Brigham Young University–Hawai'i (BYUH) is committed to a policy of nondiscrimination on the basis of race, color, sex (including pregnancy), religion, national origin, ancestry, age, disability, genetic information, or veteran status in admissions, employment, or in any of its educational programs or activities.

University policy and Title IX of the Education Amendments of 1972 prohibits sexual harassment and other forms of sex discrimination against any

participant in an educational program or activity at BYUH, including student-to-student sexual harassment.

The following individual has been designated to handle reports of sexual harassment and other inquiries regarding BYUH compliance with Title IX:

Debbie Hippolite-Wright
 Title IX Coordinator
 Vice President, Student Development & Life
 Lorenzo Snow Administration Building
 55-220 Kulanui Street
 Laie, Hawaii 96762
 Office Phone: 808-675-4819
 E-Mail: debbie.hippolite.wright@byuh.edu
 Sexual Harassment Hotline: 808-780-8875

BYUH's Office of Honor upholds a standard which states that parties can only engage in sexual activity freely within the legal bonds of marriage between a man and a woman. Consensual sexual activity outside the bonds of marriage is against the Honor Code and may result in probation, suspension, or dismissal from the University.

8.3 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.

8.4 Accommodating Special Needs

Brigham Young University–Hawai‘i (BYUH) is committed to providing a working and learning atmosphere, which reasonably accommodates qualified persons with disabilities. If you have a disability and need accommodations, you may wish to self-identify by contacting:

Services for Students with Special Needs
McKay Building, Room 181
Phone: 808-675-3518 or 808-675-3999
Email address: aunal@byuh.edu

The Coordinator for Students with Special Needs is Leilani A‘una.

Students with disabilities who are registered with the Special Needs Services should schedule an appointment with the instructor to discuss accommodations. If the student does not initiate this meeting, it is assumed no accommodations or modifications will be necessary to meet the requirements of this course. After registering with Services for Students with Special Needs, and with permission of the student, Letters of Accommodation will be sent to instructors.

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 808-780-8875.

9 Syllabus Summary

Brigham Young University–Hawai‘i (BYUH) has adopted certain requirements relating to the information that must be provided in syllabi. This section lists those requirements and for each item either provides the information directly or gives a link to where it is provided above.

- Course Information:** See section 2.1.
- **Title:** Discrete Mathematics I
 - **Number:** CIS 205
 - **Semester/Year:** Fall 2014
 - **Credits:** 3
 - **Prerequisites:** CIS 101
 - **Location:** GCB 140
 - **Meeting Time:** MWF 08:40 to 09:40

- Faculty Information:** See section 2.2.
- **Name:** Don Colton
 - **Office Location:** GCB 128
 - **Office Hours:** MWF 14:30 to 15:30.
 - **Telephone:** 808-675-3478
 - **Email:** doncolton2@gmail.com

Course Readings/Materials: See section 2.3 for a list of textbooks, supplementary readings, and supplies required.

Course Description: See section 2.1.

Expected Proficiencies:

See section 1.2 for the proficiencies you should have before undertaking the course.

Course Goals and Student Learning Outcomes, including Alignment to Program (PLOs) and Institutional (ILOs) Learning Outcomes, and extent of coverage.

See section 7 for learning outcomes, showing the content of the course and how it fits into the broader curriculum. A listing of the departmental learning outcomes is provided together with the ratings taken from department’s matrix assessment document representing the degree to which the course addresses each outcome.

Instructional Methods: See section 5.

Learning Management System:

<https://dcquiz.byuh.edu/> is the learning management system for my courses.

Framework for Student Learning:

See section 5.1 for a discussion of the student learning framework and how I use it.

Course Calendar: See section 3 for the calendar in general.

Here are some items of particular interest:

- **First Day of Instruction:** Mon, Sep 08
- **Last Day to Withdraw:** Fri, Oct 31
- **Last Day of Instruction:** Mon, Dec 08
- **Final Exam:** Wed, Dec 10, 07:00 to 09:50
- **Final Exam Location:** GCB 140

Course Policies: See section 6.

- **Attendance:** See section 4.2.
- **Tardiness:** See section 4.2.
- **Class Participation:** See section 5.1.2.
- **Make-Up Exams:** See section 6.2.
- **Plagiarism:** See section 8.1.2.
- **Academic Integrity:** See section 8.1.

Evaluation (Grading): See section 4.

Academic Honesty: See section 8.1.

Sexual Harassment and Misconduct: See section 8.2.

Grievances: The university grievance policy states that the policies listed on the syllabus can act as a contract and will be considered if a student complains about the faculty.

Services for Students with Special Needs: See section 8.4.