Discrete Structures

CSIS2430 401

Instructor Information

Phone:
Email:
Office Location:
Office Hours

Best Time to Contact:

Course Description

An introduction to discrete mathematics and algebraic structures as applied to computer science. Proposition and logic, finite sets, relations, functions, graph theory, analysis of algorithms and state machines are taught. It is recommended that students take CSIS 2420 in the same semester as this course.

Pre-Requisite(s): CSIS 1410
Semester(s): Fall & Spring

Course Student Learning Outcomes

- Mathematical Reasoning. Introduction to formal mathematical statements, logic, theorems and proofs. We will cover several fundamental strategies for proving mathematical statements.
- Set Theory and Boolean Logic. Introduction to sets, set operations, proving set properties and Boolean Logic.

- Relations and Functions. Introduction to relations, equivalence relations, functions, and properties of functions.
- Combinatorics and Probability. Basic combinatorics, counting principles, and an introduction to discrete probability.

Course Prerequisites

Pre-requisite: CSIS 1410 (Or equivalent Java programming experience)

Co-requisite: CSIS 2420 (Data Structures and Algorithms)

Communication Plan

Example language:

I will respond to email within 12 hours

I will offer feedback on major assignments within 48 hours of the due date

The best way to contact me is via the Canvas Inbox, as I will prioritize this email over other modes of communication.

Keys for Success (how to succeed in the course)

For students to be successful in this course, the following actions and student engagement activities are strongly recommended and encouraged:

1. Before class, read the assigned sections and/or watch the videos

2. Attend class, take notes, and participate in class activities. Complete all your assignments, and do your best.

3. Read and study the lecture notes, slides, and the relevant handouts.

4. Use the STEM Learning Resource Center, the Computer Science tutoring center, fellow students (study groups are always a good idea) and any other resources available.

5. Do not hesitate to ask questions.

6. Turn on your Canvas Notifications so that when announcements are posted about the course you get notified immediately.

7. Be familiar with the late policy for this course.

Class Philosophy: This is being taught as a flipped class. Please review the course material prior to coming to class, watch any videos that cover that days reading, and doing any material listed online for that day. Rather than simply repeating what was in the text, we will be spending time in class going over alternate derivations and explanations, tackling sample problems (sometimes as a class, sometimes in small groups), discussing design problems and reviewing the physical and mathematical underpinnings of electrical engineering. This may be a more dynamic class than you may have seen before, requiring you to think about the processes that we are discussing. I'd like to lay out a few ground rules.

- Please be in class every time (and on time). We often spend the first five to fifteen minutes answering questions about previous lectures and the upcoming homework sets.
- Please try to participate in each class discussion, but also don't be afraid to say that you don't know. We are here to learn, and saying that something isn't clear is often the first step to fully understanding something.
- Have fun. This is an exciting field full of interesting problems that have real life impacts on the world around us.

Assignment Schedule

Due Date	Assignment Name	Assignment Type	Points
	Introduce Yourself	Discussion	0
	Introduce Yourself	Discussion	0
	Module 6: Challenge Activity #3 - Mathematical Induction	Assignment	0

Due Date	Assignment Name	Assignment Type	Points
4/29	Module 1: Pre Class Prep Optional Reading	Assignment	0
4/29	Module 3: Pre-Class Prep Optional Reading	Assignment	0
4/29	Module 6: Pre-Class Prep Optional Reading	Assignment	0
4/29	Module 7: Pre-Class Prep Optional Reading	Assignment	0
8/25	Module 1: Pre-Class Prep #1 - Propositional Logic & Logical Equivalences	Assignment	67
8/27	Module 1: Pre-Class Prep #2 - Predicates and Quantifiers	Assignment	36
8/28	Aug 26 Quiz	Quiz	15
8/30	Aug 28 Quiz	Quiz	15
8/30	Module 1: Challenge Activity #1 - Propositional Logic & Logical Equivalences	Assignment	39
8/30	Module 1: Challenge Activity #2 - Predicates and Quantifiers	Assignment	14

Due Date	Assignment Name	Assignment Type	Points
9/2	Module 0: Assignment #2 - Orientation Quiz	Quiz	17
9/2	Module 0: Assignment #3: Who Are We?	Discussion	10
9/2	Module 0: Assignment #1 - EXTRA CREDIT (5 Points)	Assignment	0
9/3	Module 1: Pre-Class Prep #3 - Nested Quantifiers	Assignment	28
9/6	Sep 04 Quiz	Quiz	15
9/6	Module 1: Challenge Activity #3 - Nested Quantifiers	Assignment	7
9/8	Module 1: Pre-Class Prep #4- Boolean Algebra & Logic Gates	Assignment	66
9/10	Module 1: Pre-Class Prep #5 - Circuit Reduction (K-Maps)	Assignment	91
9/11	Sep 09 Quiz	Quiz	15
9/13	Sep 11 Quiz	Quiz	15
9/13	Module 1: Challenge Activity #4- Boolean Algebra & Logic Gates	Assignment	25

Due Date	Assignment Name	Assignment Type	Points
9/13	Module 1: Challenge Activity #5 - Circuit Reduction (K-Maps)	Assignment	38
9/13	Programming Project 0	Assignment	20
9/15	Module 1: Pre-Class Prep #6 - Circuit Reduction (QM)	Assignment	42
9/17	Module 2: Pre-Class Prep #1 - Rules of Inference	Assignment	39
9/18	Sep 16 Quiz	Quiz	15
9/20	Module 1 (Logic) Summary Quiz	Quiz	10
9/20	Sep 18 Quiz	Quiz	15
9/20	Module 1: Challenge Activity #6 - Circuit Reduction (QM)	Assignment	7
9/20	Module 2: Challenge Activity #1 - Inference	Assignment	12
9/22	Module 2: Pre-Class Prep #2 - Introduction to Proofs	Assignment	66
9/24	Module 2: Pre-Class Prep #3 - More Proofs	Assignment	47
9/25	Sep 23 Quiz	Quiz	15
9/27	Module 2 (Proofs) Summary Quiz	Quiz	8

Due Date	Assignment Name	Assignment Type	Points
9/27	Sep 25 Quiz	Quiz	15
9/27	Module 2: Challenge Activity #2 - Introduction to Proofs	Assignment	13
9/27	Module 2: Challenge Activity #3 - More Proofs	Assignment	9
9/29	Module 3: Pre-Class Prep #1 - Introduction to Sets	Assignment	69
10/1	Module 3: Pre-Class Prep #2 - Functions	Assignment	45
10/2	Sep 30 Quiz	Quiz	15
10/4	Oct 02 Quiz	Quiz	15
10/4	Module 3: Challenge Activity #1 - Introduction to Sets	Assignment	38
10/4	Module 3: Challenge Activity #2 - Functions	Assignment	18
10/4	Programming project 1	Assignment	20
10/6	Module 3: Pre-Class Prep #3 - Relations	Assignment	72
10/8	Module 3: Pre-Class Prep #4 - Matrices and More	Assignment	72
10/9	Oct 07 Quiz	Quiz	15

Due Date	Assignment Name	Assignment Type	Points
10/11	Module 3 (Basic Structures) Summary Quiz	Quiz	11
10/11	Oct 09 Quiz	Quiz	15
10/11	Module 3: Challenge Activity #3 - Relations	Assignment	7
10/11	Module 3: Challenge Activity #4 - Matrices and More	Assignment	18
10/13	Module 5: Pre-Class Prep #1 - Introduction to Graphs	Assignment	42
10/15	Module 5: Pre-Class Prep #2 - More Graphs	Assignment	64
10/16	Oct 14 Quiz	Quiz	15
10/18	Midterm	Quiz	25
10/18	Oct 16 Quiz	Quiz	15
10/18	Module 5: Challenge Activity #1 - Introduction to Graphs	Assignment	13
10/18	Module 5: Challenge Activity #2 - More Graphs	Assignment	18
10/20	Module 5: Pre-Class Prep #3 - Trees	Assignment	56

Due Date	Assignment Name	Assignment Type	Points
10/22	Module 6: Pre-Class Prep #1 - Finite State Machines & Languages	Assignment	31
10/23	Oct 21 Quiz	Quiz	15
10/25	Module 5 (Advanced Structures) Summary Quiz	Quiz	9
10/25	Oct 23 Quiz	Quiz	15
10/25	Module 5: Challenge Activity #3 - Trees	Assignment	12
10/25	Module 6: Challenge Activity #1 - Finite State Machines & Languages	Assignment	4
10/25	Programming project 2	Assignment	20
10/27	Module 6: Pre-Class Prep #2 - Sequences & Summations	Assignment	35
10/29	Module 6: Pre-Class Prep #3 - Mathematical Induction	Assignment	52
10/30	Oct 28 Quiz	Quiz	15
11/1	Oct 30 Quiz	Quiz	15

Due Date	Assignment Name	Assignment Type	Points
11/1	Module 6: Challenge Activity #2 - Sequences & Summations	Assignment	18
11/3	Module 6: Pre-Class Prep #4 - Recursion	Assignment	49
11/5	Module 7: Pre-Class Prep #1 - Counting	Assignment	21
11/6	Nov 04 Quiz	Quiz	15
11/8	Module 6 (Computation) Summary Quiz	Quiz	10
11/8	Nov 06 Quiz	Quiz	15
11/8	Module 6: Challenge Activity #4 - Recursion	Assignment	3
11/8	Module 7: Challenge Activity #1 - Counting	Assignment	5
11/10	Module 7: Pre-Class Prep #2 - Permutations	Assignment	34
11/12	Module 7: Pre-Class Prep #3 - Binomial Coefficients and Combinatorial Identities	Assignment	63
11/13	Nov 11 Quiz	Quiz	10

Due Date	Assignment Name	Assignment Type	Points
11/15	Module 7 (Combinatorics) Summary Quiz	Quiz	9
11/15	Nov 13 Quiz	Quiz	15
11/15	Module 7: Challenge Activity #2 - Permutations	Assignment	15
11/15	Module 7: Challenge Activity #3 - Binomial Coefficients and Combinatorial Identities	Assignment	11
11/15	Programming project 3	Assignment	20
11/17	Module 8: Pre-Class Prep #1 - Probability & Bayes' Theorem	Assignment	60
11/19	Module 8: Pre-Class Prep #2 - Random Variables & Bernoulli Trials	Assignment	28
11/20	Nov 18 Quiz	Quiz	15
11/22	Module 8 (Probability) Summary Quiz	Quiz	9
11/22	Nov 20 Quiz	Quiz	15
11/22	Module 8: Challenge Activity #1 - Probability & Bayes' Theorem	Assignment	8

Due Date	Assignment Name	Assignment Type	Points
11/22	Module 8: Challenge Activity #2 - Random Variables & Bernoulli Trials	Assignment	13
11/24	Module 9: Pre-Class Prep #1 - Number Theory	Assignment	38
11/27	Nov 25 Quiz	Quiz	15
11/29	Module 9: Challenge Activity #1 - Number Theory	Assignment	18
12/1	Module 9: Pre-Class Prep #2 - Cryptography	Assignment	42
12/4	Dec 02 Quiz	Quiz	15
12/6	Module 9 (Number Theory) Summary Quiz	Quiz	9
12/6	Final Project - Monopoly Simulation	Assignment	30
12/6	Module 9: Challenge Activity #2 - Cryptography	Assignment	21
12/9	Final Exam	Quiz	63

Brief Description of Assignments/Exams

Before each class there is a required pre class reading assignment. After each class there will be a post class quiz and most sections have a homework assignment as well.

There will be a series of programming projects where you will be able to put some of what we are learning in practice. Each of these also has questions that provide chances to think about the work we are doing and the implications to computer science and programming in general.

In addition to the reading, quizzes, projects, and homework mentioned above, there will be a midterm and a final.

Grading Scale

Grading Scale	A 94% - 100%	A- 90% - 93%
B+ 87% - 89%	B 84% - 86%	B- 80% - 83%
C+ 77% - 79%	C 74% - 76%	C- 70% - 73%
D+ 67% - 69%	D 64% - 66%	D- 60% - 63%
E 59% and below		

How to Navigate to Canvas

Institutional Policies

As members of our academic community, we would like to invite you to review the Institutional Syllabus which covers important policies and procedures. This document contains important links for students on the code of student rights and responsibilities, academic integrity, and grading policies, Title IX and other important acknowledgements. By familiarizing yourself with this information, you can help us create a safe and respectful environment for everyone.

You can access the document by clicking on the following link:
https://slcc.instructure.com/courses/530981/pages/institutional-syllabus

Learning Support and Tutoring Services

We are pleased to offer a range of tutoring and learning support services to help you achieve your academic goals. Whether you need assistance with a specific subject or want to improve your study skills, you have many options for tutoring or other support.

To learn more about the services we offer and how to access them, please visit the Institutional Syllabus under the Tutoring and Learning Support tab: https://slcc.instructure.com/courses/530981/pages/institutional-syllabus. We encourage you to take advantage of these resources to help you succeed in your studies. If you have any questions or would like to schedule a tutoring session, please don't hesitate to reach out to us. We are here to support you in any way we can.

Advising and Counseling Support Services

At our institution, we are committed to supporting your academic and personal growth. That's why we offer a range of advising and counseling services to help you navigate the challenges of college life. To learn more about the resources available to you and how to access them, please visit the Institutional Syllabus under the Advising and Counseling Support Services tab: https://slcc.instructure.com/courses/530981/pages/institutional-syllabus. Our advising team and the support centers across campus are here to support you in achieving your goals and overcoming any obstacles you may face.

Student Academic Calendar

As students you should be aware of all important dates in the semester, such as the day that courses begin and end, as well as the drop date and the last day to withdraw. To learn more about those dates, navigate to the Student Academic Calendar below:

SLCC Student Academic Calendar