Master Course Syllabus

For additional course information, including prerequisites, corequisites, and course fees, please refer to the Catalog: https://catalog.uvu.edu/

Semester: Spring
Year: 2025
Course Prefix: CS
Course and Section #: 2300-001
Course Title: Discrete Mathematics I
Credits: 3

Course Description

Covers algebraic structures applied to computer programming. Includes logic, sets, elementary number theory, mathematical induction, recursion, algorithm complexity, combinatorics, relations, graphs, and trees. Lab access fee of $45 for computers applies.

Course Attributes

This course has the following attributes:
☐ General Education Requirements
☐ Global/Intercultural Graduation Requirements
☐ Writing Enriched Graduation Requirements
☒ Discipline Core Requirements in Program
☐ Elective Core Requirements in Program
☐ Open Elective
Other: *Click here to enter text.*

Instructor Information

Instructor Name: Nathan Cordner

Student Learning Outcomes

Upon successful completion, students should be able to . . .
1 Use symbolic logic to determine proper conditional clauses in a program
2 Prove theorems algebraically
3 Perform basic operations on sets
4 Determine the nature of the growth of a function or algorithm
5 Prove properties of recursive algorithms using mathematical induction
6 Use relations and functions in the design of algorithms and applications

Course Materials and Texts

The textbook for this course will use the following digital textbook: CS 2300 - Discrete Mathematical Structures I, Sandy Irani, zyBook ISBN: 978-1-394-02772-9 purchased from **Learn zyBooks.**
If you are using Wolverine Access (flat fee of $250 per semester for all textbooks):

Zybook access codes should be provided to you by the Library. Stay tuned for details.

If you have opted out of Wolverine Access:

- Students are required to purchase access from **Learn zyBooks.** for $64.
- Subscribe to the book:
  - Sign in or create an account at learn.zybooks.com.
  - Enter zyBook code: UVUCS2300CordnerSpring2025
  - Subscribe (This course is CS2300-001)
- You can start the subscription on Dec. 23, 2024. The cutoff to subscribe is Apr. 20, 2025. Subscription will last until May 19, 2025.

Course Requirements

Course Assignments, Assessments, and Grading Policy

Assignment and Assessment Descriptions

Class Attendance / Participation

Class attendance is the expectation for a face-to-face section. For full credit, you must attend at least **90%** of the lectures (no more than 3 classes missed). Your grade will be determined by the percentage of lectures that you do attend (total of 29 possible this semester) out of the total number required (26 this semester). Half-credit may be given for attending part of a class while missing significant portions of the class discussion. No credit will be given for attending without being engaged in class discussion.

Please come see me if there are extenuating circumstances that prevent your attendance for prolonged periods during the semester. **Students who are unable to come to campus at all during class time and are hoping to participate remotely need to make arrangements with me.**

Textbook Activities:

Participation and challenge activities will be assigned in the online textbook through zybooks.com. These activities will be auto-graded by zyBooks.

Participation activities are part of the textbook reading assignment and are required to be completed **before class begins** (see the course schedule for a list of reading assignments). These are graded based on **completion** (if you get one incorrect, you may try again for full credit). Three lowest reading scores will be dropped.

Challenge activities serve as a quiz at the end of each module. You may complete these as you read the textbook, but **zyBooks will record your first attempt** to each question as your official answer. One lowest quiz score will be dropped.

The scores will be kept in zyBooks. I will manually upload them into Canvas. *No late submission for these activities*.

Assignments:

Selected problems in zyBooks at the end of each section will be assigned as homework assignments. You will **type your homework using LaTeX** and submit it in pdf format in Canvas. Two lowest homework scores will be dropped.

Discussions:

Discussions will be opportunities to explore topics together. Posts to the discussion should add significantly to the conversation and support your point of view. *Comments that do not add significantly to a discussion will receive **no credit**.* It is okay to disagree in a discussion. In fact much learning happens when we disagree. However we need to be respectful and keep our online classroom a safe place to learn.

Due dates for discussions correspond with the initial post submitting date. Follow up comments are due on or before "available until" dates in Canvas. One lowest discussion score will be dropped.

Assessments:

There are two midterms and one final exam as the assessment instrument for this course. Midterm 1 will cover chapters 1 - 2 of the textbook. Midterm 2 covers chapters 3 - 7. The final is comprehensive, but covers primarily chapters 8 - 9. Each exams will have two sections: multiple choices and written answers. All three exams will be timed with a time limit of three hours.

Solutions will be available after each exam's close date. Optional test corrections are due one week after the exam's close. You can earn back up to half of the points you missed by submitting corrections.

Grading and Late Work Statement

Grading Scale:

The following grading standards will be used in this class:

Grading Scale Table

Grading Scale:

93% or higher	A	90 - 92.9%	A-
87 - 89.9%	B+	83 - 86.9%	B
80 - 82.9%	B-	77 - 79.9%	C+
73 - 76.9%	C	70 - 72.9%	C-
67 - 69.9%	D+	63 - 66.9%	D
60 - 62.9%	D-	0 - 59.9%	E

Assignment Categories:

Assignment Categories:

Activity	**Percent**
Class Attendance / Participation	10
Textbook "Participation" Activities	10

Assignment Categories:

Activity	**Percent**
Textbook "Challenge" Activities (Quizzes)	5
Canvas Discussions	5
Assignments	25
Exams	45

Late Work Statement:
In general, the penalty for late submission is 0.42% per hour (or 10.08% per day) of the full credit of the assignment up to five (5) calendar days and no submissions after five calendar days. (**There is no late submission for the online activities in Zybooks.**)

Required or Recommended Reading Assignments
Course Schedule

Date	**Required Reading**	**Module**
January 7		Module 0
January 9	1.1 to 1.3	Module 1
January 14	1.4, 1.5	Module 1
January 16	1.6 to 1.8	Module 2
January 21	1.9, 1.10	Module 2

Date	Required Reading	Module
January 23	2.1, 2.2	Module 3
January 28	2.3, 2.4	Module 3
January 30	2.5 to 2.7	Module 4
February 4	2.8 to 2.10	Module 4
February 6		**Midterm 1 Review**
February 11	3.1 to 3.4	Module 5
February 13	3.5 to 3.7	Module 5
February 18	4.1 to 4.3	Module 6
February 20	4.4 to 4.6	Module 6
February 25	5.1 to 5.3	Module 7
February 27	5.4 to 5.6	Module 7
March 4	5.7 to 5.9	Module 7
March 6	6.1 to 6.5	Module 8
March 11		**Spring Break**
March 13		**Spring Break**
March 18	7.1 to 7.5	Module 8
March 20		**Midterm 2 Review**
March 25	8.1 to 8.3	Module 9
March 27	8.4 to 8.6	Module 9
April 1	8.7 to 8.9	Module 10
April 3	8.10, 8.11	Module 10
April 8	9.1 to 9.4	Module 11
April 10	9.5 to 9.8	Module 11
April 15	9.9 to 9.12	Module 12
April 17	9.13 to 9.15	Module 12

Date	Required Reading	Module
April 22		**Final Exam Review**
April 29		**Final Exam Due**

General Description of the Subject Matter of Each Lecture or Discussion
Module 0 – Overview of course and requirements, introduction to LaTeX

Modules 1 and 2 (chapter 1) – Introduction to propositional logic, truth tables, laws of propositional logic, quantifiers, De Morgan's laws

Modules 3 and 4 (chapter 2) – Introduction to logical arguments, mathematical proofs, proof techniques such as direct proof, proof by contrapositive, proof by contradiction, proof by cases

Module 5 (chapter 3) – introduction to set theory, set operations (union, intersection), set identities, cartesian products, set partitions

Module 6 (chapter 4) – introduction to mathematical functions, properties (one-to-one, onto), inverses, composition, logarithmic and exponential functions

Module 7 (chapter 5) – introduction to binary relations, properties (symmetric, reflexive, transitive), representations (directed graphs, matrices), transitive closure, partial orders, equivalence relations

Module 8 (chapters 6 and 7) – introduction to undirected graphs, graph isomorphism, graph connectivity; introduction to trees, tree traversal, spanning trees

Modules 9 and 10 (chapter 8) – introduction to sequences and recurrence relations, mathematical induction, recursive algorithms

Modules 11 and 12 (chapter 9) – introduction to combinatorics, counting rules, permutations and combinations, multisets, inclusion-exclusion principle, binomial theorem, pigeonhole principle

Required Course Syllabus Statements

Generative AI
Students should use ChatGPT (or similar AI tools) as if it were a person. If asking another person to do task X is cheating, then asking ChatGPT and similar tools is cheating. If not, then not.

Using Remote Testing Software
☐ This course does not use remote testing software.

☒ This course uses remote testing software. Remote test-takers may choose their remote testing locations. Please note, however, that the testing software used for this may conduct a brief scan of remote test-takers' immediate surroundings, may require use of a webcam while taking an exam, may

require the microphone be on while taking an exam, or may require other practices to confirm academic honesty. Test-takers therefore shall have no expectation of privacy in their test-taking location during, or immediately preceding, remote testing. If a student strongly objects to using test-taking software, the student should contact the instructor at the beginning of the semester to determine whether alternative testing arrangements are feasible. Alternatives are not guaranteed.

Required University Syllabus Statements

Accommodations/Students with Disabilities
Students needing accommodations due to a permanent or temporary disability, pregnancy or pregnancy-related conditions may contact UVU Accessibility Services at accessibilityservices@uvu.edu or 801-863-8747.

Accessibility Services is located on the Orem Campus in BA 110.

Deaf/Hard of Hearing students requesting ASL interpreters or transcribers can contact Accessibility Services to set up accommodations. Deaf/Hard of Hearing services can be contacted at DHHservices@uvu.edu

DHH is located on the Orem Campus in BA 112.

Academic Integrity
At Utah Valley University, faculty and students operate in an atmosphere of mutual trust. Maintaining an atmosphere of academic integrity allows for free exchange of ideas and enables all members of the community to achieve their highest potential. Our goal is to foster an intellectual atmosphere that produces scholars of integrity and imaginative thought. In all academic work, the ideas and contributions of others must be appropriately acknowledged and UVU students are expected to produce their own original academic work.

Faculty and students share the responsibility of ensuring the honesty and fairness of the intellectual environment at UVU. Students have a responsibility to promote academic integrity at the university by not participating in or facilitating others' participation in any act of academic dishonesty. As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, assessments, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Likewise, instructors are responsible to clearly state expectations and model best practices.

Further information on what constitutes academic dishonesty is detailed in UVU Policy 541: *Student Code of Conduct*.

Equity and Title IX
Utah Valley University does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation, gender identity, gender expression, age (40 and over), disability, veteran status, pregnancy, childbirth, or pregnancy-related conditions, citizenship, genetic information, or other basis protected by applicable law, including Title IX and 34 C.F.R. Part 106, in employment, treatment, admission, access to educational programs and activities, or other University benefits or services. Inquiries about nondiscrimination at UVU may be directed to the U.S. Department of Education's Office

for Civil Rights or UVU's Title IX Coordinator at 801-863-7999 – TitleIX@uvu.edu – 800 W University Pkwy, Orem, 84058, Suite BA 203.

Religious Accommodation

UVU values and acknowledges the array of worldviews, faiths, and religions represented in our student body, and as such provides supportive accommodations for students. Religious belief or conscience broadly includes religious, non-religious, theistic, or non-theistic moral or ethical beliefs as well as participation in religious holidays, observances, or activities. Accommodations may include scheduling or due-date modifications or make-up assignments for missed class work.

To seek a religious accommodation, a student must provide written notice to the instructor and the Director of Accessibility Services at accessibilityservices@uvu.edu. If the accommodation relates to a scheduling conflict, the notice should include the date, time, and brief description of the difficulty posed by the conflict. Such requests should be made as soon as the student is aware of the prospective scheduling conflict.

While religious expression is welcome throughout campus, UVU also has a specially dedicated space for meditation, prayer, reflection, or other forms of religious expression.