CSC 226-601 Discrete Mathematics for Computer Scientists - 3 Credit Hours - Spring 2024
Instructor: Alan Watkins

Office Hours:	Thursday 2-4pm by appointment only. Note that I do not have a physical office on campus...just give me a call at the number below if it's something that can be handled over the phone!
E-Mail:	awwatkin@ncsu.edu Emails are responded to within 24 hours, emails after hours on Friday will be responded to by noon the following Monday
Course Website:	https://wolfware.ncsu.edu - Login, choose current class
Phone:	919-793-5548 You are welcome to call/leave a message...email is definitely quicker as I am in and out throughout the day.
TA:	**Xuanhao Luo**
TA E-Mail:	xluo26@ncsu.edu
TA Office:	TBD
TA Hours:	TBD
TA Office Phone:	TBD
Course Description:	Propositional logic and predicate calculus. Methods of proof. Elementary set theory. Mathematical induction. Recursive definitions and algorithms. Solving recurrences. The analysis of algorithms and asymptotic growth of functions. Elementary combinatorics. Introduction to graph theory. Ordered sets, including posets and equivalence relations. Introduction to formal languages and automata.
Textbooks:	**Required:** *CSC226: Deicrete Mathematics for Computer Scientists Zybook* 1. Sign in or create an account at learn.zybooks.com 2. Enter zyBook code: **NCSUCSC226WatkinsSpring2024** 3. Subscribe **Optional:** *Discrete Mathematics and its Applications, 7th Edition*. Kenneth Rosen, McGraw-Hill, 2012. **Print:** ISBN-10: **0-07-338309-0** / ISBN-13: **978-0-07-338309-5** **eText:** ISBN-10: **0-07-735347-1** / ISBN-13: **978-0-07-735347-6** **Optional:** *Student Solutions Guide, 7 th Edition.* Kenneth Rosen, McGraw-Hill, 2012. ISBN-10: **0-07-735350-1** / ISBN-13: **978-0-07-735350-6**
Prerequisites:	*MA 101 or equivalent from high school ; CSC, CSU, CPE, CPU Majors*
Lectures:	Since this is a distance education class, the lectures are streaming online videos. Follow the flow of the course on the website. If under week#1 it lists lecture#1, it means you should watch lecture#1 sometime that week, etc. Links to the videos are also on the course homepage as well as lecture notes. Students should have access to a copy of the lecture notes when viewing a lecture.

Grading:

The final grade in the course is based on:
Homework (30%)
3 Exams (15% each)
Final Exam (25%)

Final letter grades are determined by the following scale:

97	≤	A+	≤	100
93	≤	A	<	97
90	≤	A-	<	93
87	≤	B+	<	90
83	≤	B	<	87
80	≤	B-	<	83
77	≤	C+	<	80
73	≤	C	<	77
70	≤	C-	<	73
67	≤	D+	<	70
63	≤	D	<	67
60	≤	D-	<	63
0	≤	F	<	60

Homework policy:

There will be weekly homework assignments. The due date for each homework and the problems are listed on the course website. Homework will NOT be accepted late. Homework MUST be turned in by midnight Eastern Time. Students may turn in the homework by submitting files through moodle.

- During the summer semester, there are 10 HW assignments (each longer than the ones given during the regular semester), 1 of which will be dropped
- During the regular semesters, there are 15 HW assignments, 2 of which will be dropped

Exam policy:

Exams must be taken **individually** by each student. Collaboration is **not** permitted, and each student is honor-bound to observe this policy. Exams will require a proctor. For those of you close enough to campus, you can use DELTA as your proctor. Remote students must find a proctor and have them approved. Further information about proctors will be sent from the EOL office around the end of the first week of class.

All exams must be taken on or before the exam date on the course website unless approved by me at least 48 hours in advance. There is a one week exam window for each exam ending on the date of the exam on the course website. For example, if the exam is scheduled on a Wednesday, students may take the exam from the previous Thursday through the day on the website for the scheduled exam. Students who take/schedule an exam after the exam date will receive a 10 point deduction per day, and will receive a 0 if they do not take the exam within 2 days after the scheduled exam date.

NOTE: Make sure exams are turned in on time. 2 points per minute will be deducted if you go over the time limit for an exam. Let your proctor know this - if they say on the exam that you took 92 minutes on a 90 minute exam, then you went over 2 minutes.

Grade disputes:

Any questions about a grade on a homework must be handled within one week of when the homework grade is posted in the grade book.
Any questions about a grade on a test must be handled within one week of when the

email about returning tests for remote students is sent or the physical test is returned for those that take the exam live.

Learning Outcomes:

At the conclusion of this course, students should be able to

- Represent logical statements in propositional and predicate calculus, and use truth tables and formal proofs to determine their truth values.
- Create a truth table for a logical expression. Derive a logical expression from a given truth table. Design a circuit to perform a simple task.
- Construct a circuit from a logical expression using AND, OR, and NOT gates. Simplify logical expressions. Derive a logical expression from a given circuit.
- Describe set notations using predicate calculus. Use predicate calculus to prove set theoretic propositions.
- Describe and use proof by induction. Derive closed form representations for recursively defined sequences; prove their correctness by induction. Derive recursive sequences from closed form functions and prove their equivalence by induction.
- Describe asymptotic growth of functions, compare functions using big-oh notation. Compare asymptotic growth and prove inequalities by induction. Determine and solve recurrences arising from algorithms.
- Define binary relations and their properties using predicate calculus. Represent binary relations as ordered pairs, matrices or graphs. Combine binary relations by union, intersection, and composition using matrix operations.
- Describe and calculate permutations and combinations with and without replacement and with and without distinguishable objects. Describe and apply the pigeonhole principle. Calculate probabilities using basic principles.
- Describe and determine the existence of Euler circuits and paths and Hamilton circuits and paths in graphs. Determine the minimum spanning tree of a graph. Construct and analyze Hasse diagrams for partially ordered sets.

Academic Integrity Statement

Students are required to comply with the university policy on academic integrity found in the Code of Student Conduct found at http://policies.ncsu.edu/policy/pol-11-35-01. Violations of academic integrity will be handled in accordance with the Student Discipline Procedures (NCSU REG 11.35.02). Your signature on any test or assignment indicates "I have neither given nor received unauthorized aid on this test or assignment."

Statement for students with disabilities:

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with the Disability Resource Office at Holmes Hall, Suite 304, 2751 Cates Avenue, Campus Box 7509, 919-515-7653. For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation (NCSU REG 02.20.01).

Digital Course Components

The course material is hosted on the NCSU Moodle platform and lectures are posted via Panopto.

Students may be required to disclose personally identifiable information to other students in the course, via the digital tools, such as email or web-postings, where relevant to the course. Examples include online discussions of class topics, and posting of student coursework. All students are expected to respect the privacy of

each other by not sharing or using such information outside the course.

Please Evaluate this Course:

Please give us your feedback and evaluate this course at https://classeval.ncsu.edu at the end of the semester when you are emailed about doing so.

Be aware, however, that the window for doing this is relatively short (about a week).

If you need help with this evaluation procedure, please write to classeval@help.ncsu.edu

We appreciate your input!

Additional NC State Rules and Regulations:

Students are responsible for reviewing the NC State University Policies, Rules, and Regulations (PRRs) which pertain to their course rights and responsibilities, including those referenced both below and above in this syllabus:

Equal Opportunity and Non-Discrimination Policy Statement https://policies.ncsu.edu/policy/pol-04-25-05 with additional references at https://oied.ncsu.edu/divweb/policies/

Code of Student Conduct https://policies.ncsu.edu/policy/pol-11-35-01