

ECEN 227 - Introduction to Finite Automata and Discrete Mathematics

Dr. Mahmoud Nabil
North Carolina A & T State University

August 21, 2019

Introduction

- **Course Description:** An introduction to applied discrete mathematics as it relates to computer engineering.
- **TA:** TBA
- **Credits:** 3
- **Prerequisite:** ECEN 101 (Prob Solving With MATLAB)
- **Textbook:** An online book has been set up for the course at www.zybooks.com. Go to this website and create account. Once you have an account, use to the following book code for this course: NCATECEN227NabilFall2019. You will be instructed on how to purchase the book (\$58).
- **Course Materials:** Please visit <https://mahmoudnabil.github.io>
- **Class Schedule:** This class meets on MWF 1:00-1:50 AM in McNair, Room 130.
- **Office Hours:** MWF 2:30-4:30 AM in McNair, Room 555.

References to be Used



Sandy Irani

Discrete Mathematics

Discrete Math zyBook.



Kenneth H. Rosen

Discrete Mathematics and Its Applications, 7th Edition

McGraw-Hill, New York, NY, 2012.



Susanna S. Epp

Discrete Mathematics with Applications, 4th Edition

Brooks/Cole Publishing Company, Pacific Grove, California, 2011.



Ding-Zhu Du, Ker-I Ko

Problem Solving in Automata, Languages, and Complexity, 4th Edition

John Wiley & Sons, Inc, New York, 2001

Intended Learning Outcomes (1/2)

- Utilize mathematical reasoning to read, comprehend, and construct mathematical arguments.
- Solve basic counting problems with combinatorial analysis.
- Utilize basic discrete structures appropriately to model, analyze, and solve problems.
- Specify algorithm design using pseudocode.
- Explain how propositional logic is related to computation

Intended Learning Outcomes (1/2)

- Utilize mathematical reasoning to read, comprehend, and construct mathematical arguments.
- Solve basic counting problems with combinatorial analysis.
- Utilize basic discrete structures appropriately to model, analyze, and solve problems.
- Specify algorithm design using pseudocode.
- Explain how propositional logic is related to computation

Intended Learning Outcomes (1/2)

- Utilize mathematical reasoning to read, comprehend, and construct mathematical arguments.
- Solve basic counting problems with combinatorial analysis.
- Utilize basic discrete structures appropriately to model, analyze, and solve problems.
- Specify algorithm design using pseudocode.
- Explain how propositional logic is related to computation

Intended Learning Outcomes (1/2)

- Utilize mathematical reasoning to read, comprehend, and construct mathematical arguments.
- Solve basic counting problems with combinatorial analysis.
- Utilize basic discrete structures appropriately to model, analyze, and solve problems.
- Specify algorithm design using pseudocode.
- Explain how propositional logic is related to computation

Intended Learning Outcomes (1/2)

- Utilize mathematical reasoning to read, comprehend, and construct mathematical arguments.
- Solve basic counting problems with combinatorial analysis.
- Utilize basic discrete structures appropriately to model, analyze, and solve problems.
- Specify algorithm design using pseudocode.
- Explain how propositional logic is related to computation

Intended Learning Outcomes (2/2)

- Verify algorithm operation.
- Analyze time complexity of algorithms.
- Apply discrete mathematics to practical scenarios
- Utilize graph theory to model systems
- Demonstrate proofs for mathematical theorems
- Convert between numbering systems of different bases.

Intended Learning Outcomes (2/2)

- Verify algorithm operation.
- Analyze time complexity of algorithms.
- Apply discrete mathematics to practical scenarios
- Utilize graph theory to model systems
- Demonstrate proofs for mathematical theorems
- Convert between numbering systems of different bases.

Intended Learning Outcomes (2/2)

- Verify algorithm operation.
- Analyze time complexity of algorithms.
- Apply discrete mathematics to practical scenarios
- Utilize graph theory to model systems
- Demonstrate proofs for mathematical theorems
- Convert between numbering systems of different bases.

Intended Learning Outcomes (2/2)

- Verify algorithm operation.
- Analyze time complexity of algorithms.
- Apply discrete mathematics to practical scenarios
- Utilize graph theory to model systems
- Demonstrate proofs for mathematical theorems
- Convert between numbering systems of different bases.

Intended Learning Outcomes (2/2)

- Verify algorithm operation.
- Analyze time complexity of algorithms.
- Apply discrete mathematics to practical scenarios
- Utilize graph theory to model systems
- Demonstrate proofs for mathematical theorems
- Convert between numbering systems of different bases.

Intended Learning Outcomes (2/2)

- Verify algorithm operation.
- Analyze time complexity of algorithms.
- Apply discrete mathematics to practical scenarios
- Utilize graph theory to model systems
- Demonstrate proofs for mathematical theorems
- Convert between numbering systems of different bases.

Course Outline

Topics Covered	Week	Tentative Testing Dates
Propositional Logic	1,2	Exam #1, Sept. 25th
Proofs	3	
Set Theory	4	
Functions	5	
Algorithms	6,7	Exam #2, Nov. 1st
Number Theory	8	
Induction and Recursion	10,11	
Counting Techniques	12	
Relations	13,14	Exam #3, Nov. 20th
Graphs	15	
Trees + all concepts	16	Final Exam, Mon, Dec. 4th , 10:30a 12:30p

Grade Evaluation

Grading Scale:

- A = 90 to 100
- A- = 88 to 89
- B+ = 86 to 87
- B = 80 to 85
- B- = 78 to 79
- C+ = 76 to 77
- C = 70 to 75
- C- = 68 to 69 (F for Graduate Students)

- D+ = 66 to 67 (F for Graduate Students)
- D = 60 to 65 (F for Graduate Students)
- F = 59 or less

Category	Weight
Quizzes (Approx. weekly)	15%
Homework (Quiz Preparation)	10%
Exams	50%
Final Exam	25%

Academic Integrity

- Academic integrity violations, when submitting course-related work, will result in the loss of credit for the specific assignment, quiz, individual project or exam, or a grade of F for the course. Repeated academic integrity violations may lead to dismissal from the University.
- To review the North Carolina A & T State University's Academic Dishonesty Policy, please see the following URL: [Here](#) (pp. 42-43).

Policies

Attendance Policy: Attendance is NOT calculated into the final grade, however regular attendance is **essential** to understanding the course material.

Grade Adjustment Policies:

- 1 Each quiz and homework grade will be curved such that the three highest grades received is the total possible points for the assignment.
- 2 The 2 lowest quiz grades will be dropped.
- 3 The 2 lowest homework grades will be dropped.
- 4 Your grade on the final exam will replace the lowest of your 3 semester exam grades ONLY if it will improve your final grade.

Policies

Missed and Late Assignment Policy:

- Make-up exams will only be offered to students with excused absences for the day of the original exam.
- A **legitimate written** excuse is to be provided on the first day of the students return to class.
- More than **10 minutes** late on an exam day will constitute an absence, in which case the student will not be allowed to take the exam, and a written excuse will be needed in order for a make-up exam to be scheduled.
- **There will be NO make-up quizzes given.**
- Excused missed quizzes can be made-up.

Policies

Computer Usage During Quizzes and Exams:

- The **ONLY** type of computing device that students will be allowed to use during a quiz or exam will be a **stand-alone** calculator, **ONLY** if permitted by the instructor for that quiz or exam.
- Use of **general purpose** computing devices (i.e., laptops, desktops, tablets, cell phones, etc.) is **forbidden** during a quiz or exam in all cases.

Policies

Cell Phone (smart device, etc.) Usage Policy:

- All cellphones should be **SILENCED** prior to the beginning of the class lecture, and should remain silenced at all times during the lecture.
- If essential, then the student should step out of the classroom before using the phone.
- Points Deductions
 - The first cellphone disturbance will serve as a **warning**.
 - After the warning, anyone caught disturbing the class with cell phone usage during a lecture will have **one point deducted** from their final grade for the course.
 - After the warning, any cell phone usage during a test or quiz will result in an automatic **zero grade** for that test or quiz.
 - These rules apply to all students whether they are present at the time of the warning or not.
- **Repeated Offenses** by an individual will be reported to the Provosts Office.

Policies

Policy for Leaving Class During an Exam or Quiz: Once an exam or a quiz starts, students will **NOT be allowed** the leave and then re-enter the classroom to complete the quiz or exam. Before leaving the classroom, the student must **turn in** the quiz or exam, which will be graded **AS IS**. **NO make-up** quiz or test will be given in this situation.



Questions 

