Discrete Structures

CS 241- 001

Department of Physical and Computer Sciences

Medgar Evers College

COURSE SYLLABUS

Instructor:	Professor Reid	Term:	Spring 2018
Office:	500G	Class Schedule:	Tue 2:00 - 3:40 Thu 2:00 - 3:40
Phone:	(718) 270-6433	Class Location:	C09
Email:	jermaine.n.reid@gmail.com	Lab Location:	Advance Computing Lab
Website:	TBA	Office Hours:	Tue 12:30 - 1:30

I. Welcome!

Welcome to Discrete Structures.

II. University Course Catalog Description

This course introduces the elements of discrete mathematics systems pertinent to the field of computer science, i.e., from the formulation of problems, to the understanding of their underlying structure, to the comparative analysis of the complexity of algorithms that can be used to solve these problems. Through computer programming examples, exercises and case studies, the following mathematical concepts are applied to computer science: sets and binary relations, functions, first-order logic, proof techniques, algebraic systems, vectors and matrices, and finite state machines, applications of graph theory to computer science and combinational computing are also introduced.

III. Course Overview

This course introduces the elements of discrete mathematics systems pertinent to the field of computer science, i.e., from the formulation of problems, to the understanding of their underlying structure, to the comparative analysis of the complexity of algorithms that can be used to solve these problems.

IV. Course Objectives

By the end of the course, students will be able to:

1. Understand formal logic syntax and semantics as well as prove logic theorems.
2. Demonstrate basic skills in understanding and constructing mathematical proofs.
3. Understand recursive definitions and recurrence relations.
4. Understand discrete math concepts.
5. Prove the correctness of a program from its formal specifications.

V. Course Prerequisites

CS151 - Introduction to Computing

VI. Course Credits

3 credits; 4 class hours.

VII. Required Texts and Materials

Mathematical Structures for Computer Science: Discrete Mathematics and its Applications, Judith L. Gersting, 2014: ISBN-13: 978-1-4292-1510-7, ISBN-10: 1-4292-1510-0

VIII. Supplementary (Optional) Texts and Mateials

To be announced on Blackboard/email and in class.

IX. Grading

1) Grade Breakdown:

Assessment	Points
Assignments	30 pts
Labs	40 pts
Exams	90 pts
Project	40 pts
Total	200 pts

2) There will be a total of six (6) assignments, twelve (8) labs, six (6) exams, and two (2) projects.
3) Exams are cumulative.
4) Letter Grade Table:

Grading Scale (%)	
97 – 100	A+
93 – 96.9	A
90 – 92.9	A−
87 – 89.9	B+
83 – 86.9	B
80 – 82.9	B−
76 – 79.9	C+
70 – 75.9	C
67 – 69.9	D+
63 – 66.9	D
60 – 62.9	D−
0 – 59.9	F

Additional criteria may affect your grade.

X. Grade Dissemination

Via email or a private conference.

XI. Course Policies

i Grades

Late Work Policy There will be **NO** make-up for quizzes and exam unless notified at least a day before the quiz or exam via email and **ONLY** by the professor's discretion. If permitted, the make-up quiz or exam must be taken before the next class.

Extra Credit Extra credit will be provided in assignments and labs. Extra credit is voided on late submission.

Incompletes An "INC" grade is given **ONLY** when the student misses the final, midterm or important assignment but is doing passing work in the course. Over three (3) absences forfeits the possibility of receiving an incomplete.

ii Technology and Media

Classroom Device/Laptop/Smartphone Usage Classroom computers and laptops usage is only allowed during all lectures to access lecture material from Blackboard and/or email, and to work on class activities; however, smartphones are pohibited.

iii Student Expectations

Attendance Policy: All students have the responsibility to arrive on time, attend class regularly, and to participate fully in the work of the course. Students who miss class are responsible to find out what was discussed and learn the material that was covered on the missed day(s). The instructor is not responsible for teaching missed material under any circumstances. Assigned readings, problems and programs should be completed before class.

Disability Access Medgar Evers College and its Office of Services for the Differently-Abled is committed to ensuring that individuals with disabilities receive reasonable accommodations under the guidelines of the Americans with Disabilities Act. Any student who may require accommodations due to a documented disability should notify the instructor at the start of the semester.

Professionalism Academic integrity and respect for the dignity of the individual are essential in any educational endeavor. In scholarly endeavors, all participants must commit themselves to truthfulness and honesty in the search for new insight and knowledge. In addition, honesty, integrity and respect in all interactions with colleagues, peers, teachers and support staff are essential professional attributes.

Academic Conduct Plagiarism is derived from the Latin word meaning to "kidnap". In modern terms, it is more analogous to "theft". A more formal definition employed for purposes of federal research grants is the "appropriation of another persons ideas, processes, results, or words without giving appropriate credit" 42 CFR § 93.103 ©. In other words, if you present someone elses work as your own, you are stealing from that person and, in academic circles, this is a very serious violation of the principles of academic integrity, respect for others, and professionalism. This definition applies regardless of the medium from which you plagiarize and whether or not the source of the copied material is itself copyrighted. Since homework assignments are to be completed individually unless otherwise specified, you will be, in fact, plagiarizing if you submit any assignment that is copied or partially copied from another student, and you will be severely penalized.

Furthermore, if a student is caught using any electronic device or trying to cheat in any way during an exam or a quiz, the student will be removed from the class and will receive a grade of zero (0).

XII. Schedule

The schedule, together with assignments, are subject to change. Announcements made in class and on Blackboard/Email override the schedule in case of conflicts.

Week	**Topic**
1	Formal Logic: ◦ Statements and Statement Letters ◦ Tautologies & Tautology Test ◦ Propositional Logic ◦ Propositional Derivation Rules
2	Formal Logic: ◦ Set & Quantifiers ◦ Predicates ◦ Predicate Logic ◦ Predicate Derivation Rules
3	Sets: ◦ Set Properties & Operators ◦ Counting Principles ◦ Inclusion & Exclusion Principle ◦ Pigeonhole Principle
4	Proof: ◦ Proof Techniques ◦ First (Weak) Principle of Induction ◦ Second (Strong) Principle of Induction ◦ Euclidean Algorithm & GCD
5	Number Theory: ◦ The Fundamental Theorem of Arithmetic ◦ Prime Properties ◦ Euler Phi Function
6	Recursion: ◦ Recursive Sequences & Sets ◦ Recursive Operations & Algorithms ◦ Linear First-Order Recursion
7	Recursion: ◦ Linear Second-Order Recursion ◦Divide-and-Conquer Recursion

8	Permutation, Combination & Binomial Theorem: ◦ Permutation ◦ Combination ◦ Binomial Theorem
9	Probability: ◦ Probability Distributions ◦ Conditional Probability ◦ Baye's Theorem ◦ Expected Value ◦ Binomial Distributions
10	Relations & Functions: ◦ Relation Properties ◦ Function Properties ◦ Mod Function
11	Matrices & Graphs: ◦ Matrix Properties ◦ Graph Properties
12	Trees: ◦ Tree Properties ◦ Decision Trees ◦ Huffman Codes
13	Graph Algorithms: ◦ Warshall's Algorithm ◦ Euler Path Problem ◦ Hamiltonian Circuit Problem
14	Graph Algorithms: ◦ Shortest-Path Problem ◦ Minimal Spanning Tree Problem ◦ Depth-First Search & Breadth-First Search
15	Computer Logic: ◦ Boolean Algebra Structure ◦ Logic Networks ◦ Minimization