



SYLLABUS

CSE 215 - DISCRETE STRUCTURES

Course Description and Outcomes:

This course introduces discrete structures and analysis techniques for computing by building on student's skills in programming and logic.

Prerequisite:

A grade of "C" or better in CSE 121 and ENGR 250

Credits: 5

Instructor: Nicholas J. Macias (Nick)

Email: nmacias@clark.edu

Office: SBG 115

Office Hours: Mon-Fri, 9:00-9:50

Text Book:

Text Book: "Applied Discrete Structures," Alan Doerr and Kenneth Levasseur, Department Of Mathematical Sciences, University of Massachusetts Lowell, available for free at www.engrcs.com/courses/cse215/cse215text.pdf

Additional Material (Optional)

USB flash drive

Portable computer

Course Outcomes	Assessments	Program Outcomes
Ability to analyze and design with: Functions, relations and their properties Sets, sequences and tuples Probability, counting (permutations and combinations) Propositional logic and logical connectives Introduction to predicate logic and its limitations Formal proof strategies: counterexample, contraposition, Contradiction, mathematical induction Recursive mathematical definitions Computational Complexity Trees, graphs and traversal strategies Modeling Computation	Programming Assignments, Homeworks and Tests	AST2-B&C
Ability to implement resulting algorithms using C or C++ programming language.	Programming Assignments, Homeworks and Tests	AST2-A&B



SYLLABUS

CSE 215 - DISCRETE STRUCTURES

Tentative Schedule (subject to change):

WEEK 1: Intro/Set Theory

- Welcome/Introduction
- Canvas; syllabus overview; additional policies
- AEW; student resources

- Sets: definitions, properties, types, operations
- Functions
- Sequences and summations
- Cardinality
- Matrices

WEEK 2: Logic

- Propositional Logic
- Theorems
- Proofs

WEEK 3: Number Theory

- Modular arithmetic
- Change of base
- Primes, divisibility, GCD
- Applications: cryptography

WEEK 4&5: Induction and Recursion

- Basic principle
- Inductive Step
- Need for a base-case
- Applications to programming

WEEK 5&6: Counting

- Pigeonhole Principle
- Permutations
- Combinations
- Recurrence relations



SYLLABUS

CSE 215 - DISCRETE STRUCTURES

WEEK 7: Boolean Algebra

- Boolean Functions
- Identities
- SOP/POS
- Logic Gates
- Minimizing Boolean Expressions

WEEK 8: Graphs and Trees

- Graphs
- Trees

WEEK 9: Algorithms

- Types of algorithms
- Analysis of algorithms
- Growth and Complexity

WEEK 10: Automata Theory

- Regular Expressions
- Finite State Automata
- Turing Machines
- Formal Languages

WEEK 11

- Relations
- Wrap-up and Review

Assessment:

- Programming Assignments (15%)
- Quizzes (25%)
- Midterm (25%)
- Comprehensive Final Exam (35%)

Students are encouraged to participate in course-related service learning such as club activities and special projects. Attend ECS Club meetings for more information.

Engineering & Computer Science Course Policies:

Visit ECS Course Policies (http://www.engrcs.com//courses/ECS_Course_Policies.pdf) for additional important and supporting materials.