



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

Class hours/location, instructor information and other important details: See "Additional Information" in Canvas for section-specific details.

Text Book: "Applied Discrete Structures," Alan Doerr and Kenneth Levasseur, Department Of Mathematical Sciences, University of Massachusetts Lowell, available for free [here](#).

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



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Tentative Schedule (subject to change):

WEEK 1

- Welcome/Introduction
- Canvas; syllabus overview; additional policies
- AEW; student resources
- Propositional Logic
- Theorems
- Proofs

WEEK 2

Induction and Recursion

WEEK 3

Number Theory

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

WEEK 4

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

WEEK 5

Counting

- Pigeonhole Principle
- Permutations
- Combinations
- Recurrence relations

WEEK 6

Relations

WEEK 7

Probability



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WEEK 8

- Graphs
- Trees

WEEK 9

Algorithms - Growth and Complexity

WEEK 10

- Regular Expressions
- Finite State Automata
- Turing Machines
- Formal Languages
- Wrap-up and Review

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](#) for additional important and supporting materials.