Course Outcomes	CSC 2259

CSC 2259: Introduction to Discrete Structures

Credit Hours: 3 hours

Frequency: Fall and Spring semesters

Prerequisites:

MATH 1552 and CSC 1254 or 1351.

Prerequisites by Topics:

Fundamentals of algebra and calculus, data structures including lists, basic concepts of recursion.

Catalog Course Description:

Set algebra including mappings and relations; algebraic structures including semigroups and groups; elements of the theory of directed and undirected graphs; Boolean algebra and propositional logic; these structures applied to various areas of computer science.

Course Outcomes

1. Be familiar with constructing proofs.
2. Be familiar with elementary formal logic.
3. Be familiar with set algebra.
4. Be familiar with combinatorial analysis.
5. Be familiar with recurrence relations.
6. Be familiar with graphs and trees, relations and functions, and finite automata.
7. Be exposed to the strategies for compare relative efficiency of algorithms.

Texts and Other Course Materials

Discrete Mathematics and Its Applications – K. Rosen 0-07-293033-0 HB Latest McGraw Hill

Major Topics

- Propositional calculus,
- Proof techniques including induction,
- Set, sequences and n-tuples,
- Binary relations,
- Relations and functions,
- Equivalence relations and partial orderings,
- Graphs,

- Combinatorics,
- Probablility, expected values, applications
- Recurrence.

Assignments/Projects/Laboratory Projects/Homework

Example homework questions:

1. Define an onto function. Give an example of a function that is not onto.
2. Prove that the expected number of *n* toss of an unbiased coin is *n*/2.
3. Define a transitive relation and an equivalence relation on a set A.
4. Show all possible linear orders on *A*= {*a,b,c*}. How many linear orders are there on a set of size *n*?
5. State the similarities and differences between a partial order and an equivalence relation.

Curriculum Category Content (estimated in semester hours)

Area	Core	Advanced	Area	Core	Advanced
Algorithms	30		Data Structures	30	10
Software Design	30		Prog. Languages	0	
Computer Arch.	0				

Relationship to Criterion 3 Outcomes

A	B	C	D	E	F	G	H	I	J	K
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Math Fundamentals:

- Sets functions, permutations, combinations, and applications to counting of strings, and trees: 8 hours
- Relations, partial orders, binary operations: 8 hours
- Proof by induction (binomial theorem, application to counting, properties of Fibonacci sequences and their generalizations): 8 hours
- Probability, expected values, and applications (including voting problems, assignment probabilities to binary trees and balanced parenthetical strings): 8 hours
- Finite-state machine: 4 hours
- Boolean algebra: 5 hours
- Propositional algebra: 5 hours

Data Structures:

- Fundamental data structures (graphs and trees): 1 hour

Algorithms and Software:

Computer Organization and Architecture:

Concepts of Programming Languages:

Social and Ethical Issues:

Oral Communication (presentations) – none

Written Communication:

Course Coordinator: Dr. Sukhamay Kundu
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