CPCS-222 Syllabus

Catalog Description

CPCS-222 Discrete Structures (I)
Credit: 3 (Theory: 3, Lab: 0, Practical: 1)
Prerequisite: None
Classification: College Required

The objective of this course is to study the logical and algebraic relationships between discrete objects. This course cultivates clear thinking and creative problem solving by developing students' mathematical maturity in several core areas: logic and proofs, sets, functions, relations, and counting techniques.

Class Schedule

Meet 50 minutes 3 times/week or 80 minutes 2 times/week

Lab/Tutorial 90 minutes 1 times/week

Textbook

Kenneth Rosen, , "Discrete Mathematics and Its Applications", McGraw-Hill Education; 7 edition (2011-06-14)

ISBN-13 9780073383095 **ISBN-10** 0073383090

Grade Distribution

Week	Assessment	Grade %
4	Homework Assignments 1	3
5	Quiz 1	3
7	Homework Assignments 2	3
8	Exam 1	20
9	Homework Assignments 3	3
11	Homework Assignments 4	3
11	Quiz 2	3
12	Exam 2	20
14	Homework Assignments 5	3
15	Graded Lab Work	5
15	Quiz 3	4
16	Comprehensive Final Exam	30

Topics Coverage Durations

Topics	Weeks
Introduction	1
The Foundations: Logic & Proofs	5
Basic Structures: Sets, Functions, Sequences, and Sums	3
Relations	2
Counting	2
Mathematical Induction, Strong Induction, and Well-	2

Last Articulated

October 23, 2017

Relationship to Student Outcomes

a	b	c	d	e	f	g	h	i	j	k	l	m	n
x													

Course Learning Outcomes (CLO)

By completion of the course the students should be able to

1. Find the truth value of propositions and compound propositions using truth tables. (a)
2. **Prove Propositional Equivalences. (a)**
3. Identify the truth value of quantifiers. (a)
4. Negate quantified expressions, nested or otherwise. (a)
5. Identify the validity of arguments in Propositional logic and use Rules of Inference to build arguments. (a)
6. Use direct proof, proof by contraposition, proof by contradiction, exhaustive proof and proof by cases to prove the validity of theorems. (a)
7. Use set notation to express sets and represent sets graphically using Venn diagrams. (a)
8. **Calculate the union, intersection, complement, cardinality, power set, and Cartisian product of sets. (a)**
9. Determine the equality of sets using membership tables and Set Identities. (a)
10. **Determine the domain, co-domain, range, type, inverse, and composition of functions. (a)**
11. List and produce the terms of a sequence and find its formulae. (a)
12. Express the sum of a sequence and compute its value. (a)
13. Represent a relation using digraphs and matrices. (a)
14. **Analyze the properties and combinations of relations. (a)**
15. Find the inverse, complement, composition, and closure of a relation. (a)
16. **Apply the basic counting principles, the pigeonhole principle, permutations and combinations to solve counting problems. (a)**
17. Use mathematical induction, strong induction, and the well-ordering property to prove the validity of statements. (a)

Coordinator(s)

Prof. Vijey Thayananthan, Professor

Dr. Zeinab Mahmoud, Assistant Professor