CSC 348 – Discrete Structures

1. CSC 348 – Discrete Structures

2. **credit units** 4  **contact hours** 4

3. **Course Coordinator**: Ignatios Vakalis

4. **Textbook (or other required material)**: Discrete Mathematics and Its Applications, Kenneth Rosen

5. a. **Course Description**: Structures of computer science: logic, sets, relations, functions, graphs and trees. Propositional and predicate logic. Applications of predicate logic to preconditions, postconditions, and proof techniques. Complexity of algorithms. Not open to students with credit in CSC 141. 4 lectures.

   b. **Prerequisite**: CSC/CPE 102 and CSC/CPE 103, with a grade of C- or better or consent of instructor, or **CSC/CPE 202** and **CSC/CPE 203**, with a grade of C- or better or consent of instructor.

   c. **Required/Elective/Selective Elective for CPE, CSC, EE, SE**

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6. a. **Course Learning Objectives**

   The student will be able to:
   - Apply formal methods of symbolic propositional and predicate logic.
   - Formulate formal logic proofs and apply logical reasoning to solve problems.
   - Determine which type of proof is best for a given problem.
   - Explain, with examples, the basic terminology of functions, relations, and sets.
   - Perform the operations associated with sets, functions, and relations.
   - Explain the asymptotic behavior of functions describing time complexity.
   - Demonstrate basic counting principles.
   - Solve recurrence equations.
   - Illustrate, by example, the basic terminology of graph theory.
   - Model problems in computer science using graphs and trees.
b. **Level at which Student Outcomes are addressed**
   (“B” = Basic level, “I” = Intermediate level, “A” = Advanced level)

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7. **Major Topics Covered: (number of lecture hours per)**
   - Propositions and predicates, logic and proofs (4)
   - Sets, functions, operations on sets and functions (3)
   - Proof techniques (5)
   - Sequences (1)
   - Intro to combinatorics: counting techniques, permutations and combinations, pigeon hole principle (5)
   - Relations, classification of relations (2)
   - Complexity of algorithms asymptotic notation (big theta, oh and omega) (3)
   - Intro to recursive algorithms; Elementary Solution methods for recurrence relations (5)
   - Graphs: paths and cycles, Euler cycle, Hamiltonian cycle, graph isomorphism, planar graphs, breadth first and depth first search algorithms (4)
   - Trees: rooted trees, binary search trees (3)