



## CORE COURSE PERFORMANCE OBJECTIVES

The student will be able to:

1. Prove mathematical statements using formal arguments of logic and set theory. (CCC 1,2,5,6,7 )
2. Categorize functions according to their properties. (CCC 1,2,5,7)
3. Justify mathematical arguments using the properties of the set of integers. (CCC 1,2,5,7)
4. Apply the principles of induction and recursion. (CCC 1,2,5,7)
5. Formulate a solution of a mathematical problem using the principles of counting. (CCC 1,2,5,7 )
6. Construct abstract models to concrete problems using graph theory. (CCC )

## MEASURABLE PERFORMANCE OBJECTIVES

- 1. Prove mathematical statements using formal arguments of logic and set theory. (CCC 1,2,5,6,7 )**
  - 1.1 Construct mathematical proofs.
  - 1.2 Perform set operations.
  - 1.3 Construct binary relations from the Cartesian product of two sets and deduce their properties.
  - 1.4 Define an equivalence relation and apply it to the partition of a set.
- 2. Categorize functions according to their properties. (CCC 1,2,5,7 )**
  - 2.1 Assess the characteristics of a function, including one to one and onto.
  - 2.2 Determine the inverse of a function and the composition of functions.
  - 2.3 Apply concepts of functions to discover the cardinality and countability of a given set.
- 3. Justify mathematical arguments using the properties of the set of integers. (CCC 1,2,5,7 )**
  - 3.1 Apply the Division and Euclidean Algorithms.
  - 3.2 Construct the greatest common multiple and least common multiple of two integers.
  - 3.3 Relate concepts of prime, relatively prime, and congruence.
- 4. Apply the principles of induction and recursion. (CCC 1,2,5,7)**
  - 4.1 Justify mathematical statements using mathematical induction.
  - 4.2 Construct sequences defined recursively and formulate the associated characteristic polynomial
- 5. Formulate a solution of a mathematical problem using the principles of counting. (CCC1,2,5,7)**
  - 5.1 Apply the principles of inclusion and exclusion.

- 5.2 Calculate permutations and combinations and apply to the solution of mathematical problems.
- 5.3 Derive and apply the Binomial Theorem to the solution of mathematical problems.
- 6. Construct abstract models of concrete problems using graph theory. (CCC 2,6,7)**
  - 6.1 Determine whether two graphs are isomorphic.
  - 6.2 Apply Eulerian circuits, Hamiltonian cycles, and trees to the solution of mathematical problems.

### **EVALUATION CRITERIA**

Students will demonstrate proficiency on all Measurable Performance Objectives at least to the 75% level. The grade will be determined using the College Grading System:

92 - 100	A
83 - 91	B
75 - 82	C
0 - 74	R

**Students should refer to the Student Handbook for information on Academic Standing Policy, Academic Honesty Policy, Students Rights and Responsibilities and other policies relevant to their academic progress.**

*Version Date: 200651  
7/5/05*