

**Discrete Structures (22C:019)**  
**(Required: Computer Engineering Track)**

**Catalog Description:**

Mathematical methods used in computer science, including logic, proof techniques (with induction), functions, relations, algorithm analysis, recurrence relations, counting methods, combinatorics, graphs, trees. Prerequisite: grade of C- or higher in 22C:016. Recommended: calculus I.

**Pre(co)requisites:**

22C:016 [P]

**Textbook:**

D. S. Malik and M. K. Sen, Discrete Mathematical Structures: Theory and Applications, Thomson Course Technology, 2004

**References:**

None

**Topics (Class Hours):**

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| 1. Sets, number theory, and logic (6)            | 4. Counting principles and recurrences (8) |
| 2. Proofs and induction (6)                      | 5. Algorithms (8)                          |
| 3. Relations, posets, functions, congruences (8) | 6. Graphs and trees (6)                    |
|  | 7. In class exams (3)                      |

**Laboratory Projects:**

None

**Class/Laboratory Schedule:**

Three 50-minute lectures per week

**Writing Assignments and Oral Presentations:**

None

**Design Component:**

None

**Contribution to the Requirements of Criterion 5:**

Math & Basic Science topics: 3 s.h.

### Course Goals: Basis for Assessment and Mapping onto Outcomes

Course Goal	Basis For Goal Assessment	Supports ABET Outcomes
1. The student will learn basic methods of set theory, formal logic and proof techniques especially relevant to computer science and engineering.	Homework problems, exam questions	a(●), k(●)
2. The students will learn combinatorial methods and discrete mathematical techniques and structures (especially sets, relations, function, graphs, and trees) important in the design and analysis of algorithms.	Homework problems, exam questions	a(●), k(●)
3. The students will learn both to see problems from a mathematical point of view and also to employ algorithmic problem-solving strategies and analysis techniques.	Homework problems, exam questions	c(●), e(○), k(●)

○ denote moderate contribution to the outcome; ● denote substantial contribution to the outcome

#### Performance Criteria:

Instructor completes a Course Outcome Rating (COR) that quantitatively evaluates student performance for each course goal-related outcome using a standard scale (4.0 = outstanding ability; 3.0 = good ability; 2.0 = adequate ability; 1.0 = poor ability; 0.0 = no ability). Instructor chooses appropriate graded course artifacts (homework questions, exam questions, etc) for each outcome rating. COR scores below 2.5 are indicative of problems with meeting course goals/outcomes and COR scores below 2.0 indicate failure to adequately meet course goals/outcomes.

#### Prepared By:

Jim Cremer (June, 2008)