

**CENG 223 - Discrete Computational Structures / Sections I, II and III****Instructors:** Faruk Polat (Section II), Yusuf Sahillioglu (Section I, III)

1. **Catalog Data:** Discrete Computational Structures (3-0) 3  
See the Catalog for more descriptive information. Prerequisites: None
2. **Textbook(s):**  
K.H.Rosen, *Discrete Mathematics and Its Applications*, McGraw-Hill, Seventh Edition, 2011.
3. **Goals:** To teach the basics of discrete mathematical structures.
4. **Course Outline:**  
*Topics*
  - (a) Propositional Logic {1 week }  
Logic, Equivalences
  - (b) Predicate Logic {2 weeks }  
Predicates and Quantifiers, Nested Quantifiers, Methods of Proof, Natural Deduction (additional material)
  - (c) Sets and Functions {1.5 weeks }  
Sets, Set Operations, Functions, Growth of Functions, Complexity of Algorithms
  - (d) Integers { 1.5 weeks}  
Integers and Division, Integers and Algorithms, Applications of Number Theory (Reading Assignment)
  - (e) Induction and Recursion {1 week }  
Sequences and Summations, Mathematical Induction, Recursive Definitions and Structural Induction, Recursive Algorithms
  - (f) Counting {2.5 week}  
Permutations and Combinations, Recurrence Relations, Solving Recurrence Relations, Generating Functions, Inclusion and Exclusion
  - (g) Relations {1 week }  
Relations and Their Properties, Representing Relations, Closure of Relations, Equivalence Relations, Partial Orderings
  - (h) Graphs{2 weeks}  
Int to Graphs, Graph Terminology, Representing Graphs, Connectivity, Euler and Hamiltonian Paths, Shortest Path Problem, Graph Coloring
  - (i) Trees {1.5 weeks}  
Int to Trees, Applications of Trees, Spanning Trees, Min Spanning Trees

*Evaluation*

- (a) Homeworks 15%,
    - use an editor to prepare solutions (you may draw figures by hand).
    - deliver your printed solutions to teaching assistants within the announced time periods
  - (b) Midterm Exam 1, 25% (Nov 5, 2014)
  - (c) Midterm Exam 2, 25% (Dec 10, 2014)
  - (d) Final Exam 35% (*TBA*).
5. Communication: All announcements including homework assignments, recitations, etc will be made in the courses newsgroup *metu.ceng.course.223*.
6. Recitations:
- Teaching Assistants (TAs) will conduct the recitation hours bi-weekly.
  - TAs will solve complementary problems and some of the homework assignments during the recitation hours.
  - Please follow the newsgroup for all announcements concerning recitations (content, schedule, room, etc).
7. Policy:
- The homework assignments that are designated as individual assignments must be completed individually. Copying from others, either from other students or off the internet is strictly forbidden and will surely constitute grounds for failure.