

# MIDDLE EAST TECHNICAL UNIVERSITY

## Department of Computer Engineering

### CEng 315 – Algorithms

Fall 2018-2019

**Instructors:** Asst.Prof. Dr. Ramazan Gokberk Cinbis (Section 1), Prof. Dr. İsmail Hakkı Toroslu (Sections 2&3)

**Teaching Assistants:** Burak Kerim Akkus, Erbil Yakisan, Omer Ekmekci

**Class Hours:** S1 - Mon: 10:40-12:30 (BMB1, 2 lecture hrs); Thr: 11:40-12:30 (BMB2, 1 lecture hr)

S2 - Tue: 13:45-15:00 (BMB3, 75 mins); Thr: 13:45-15:00 (BMB3, 75 mins)

S3 - Tue: 9:15-10:30 (BMB3, 75 mins); Thr: 9:15-10:30 (BMB3, 75 mins)

#### Outline

1. Introduction to Algorithms (1 week)
  - Algorithms, Analysis and Design (Chapters 1, 2)
2. Algorithm Analysis (2 weeks)
  - Growth of Functions (Chapter 3)
  - Summations (Chapter 3)
  - Recurrences (Chapter 4)
3. Sorting (2 weeks)
  - Comparison-Based Sorting (Chapter 7)
  - Sorting Algorithms in Linear Time (Chapter 8)
4. Searching (2 week)
  - Dynamic Programming (Chapter 15)
5. Graph Algorithms (4 weeks)
  - Elementary Graph Algorithms (BFS, DFS, Top. Sort, Strongly Con. Comp, etc.) (Chapters 22)
  - Minimum Spanning Trees (Chapter 23)
  - Single-Source Shortest Paths (Chapter 24)
  - All-Pairs Shortest Paths (Chapter 25)
  - Maximum Flow (Chapter 26)
6. String Processing (1 week)
  - String Matching (Chapter 32)
  - Huffman codes (Chapter 16.3)
7. NP-Completeness (2 week) (Chapter 34)

#### Textbook

*Introduction to Algorithms* by T. H. Cormen, C. E. Leiserson, R. L. Rivest, C. Stein, Mc Graw-Hill.

#### Grading

4 Programming Assignments (3 in lab, 1 take home)	30%
Mid Term Exam	30%
Final Exam	40%

**Midterm:** Nov 15, 17:40-19:40

**Lab exams:** Oct 26, 17:40-19:40 [Simple Algorithmic Problem]

Nov 16, 17:40-19:40 [Dynamic Programming Problem]

Dec 4-18, 17:40-19:40 [Take home prog. assignment: Advanced Graph Algorithm Problem]

Dec 28, 17:40-19:40 [String Processing Problem]

#### Policy

- Class attendance is not mandatory, but it is highly recommended. We may at times cover material that is not included in the text, and anything we cover in class could appear on an exam.
- The homework assignments that are designated as individual assignments must be completed individually. Copying from others, either from fellow students or off the internet is strictly forbidden and will surely constitute grounds for failure.