BIRZEIT UNIVERSITY

Design and Analysis of Algorithms (COM336)

Course Outline – 1^{std} Semester 2017/2018

Course Description:

This course presents the fundamental techniques for designing efficient computer algorithms and the methods for analyzing their time and space complexities. Topics include basic paradigms for algorithm design such as divide-and-conquer, dynamic programming, searching, and greedy method, use of efficient data structures, proofs of algorithm correctness, analysis of running times, lower bounds on the complexity of problems, and graph algorithms, and Parallel Processing Topologies, Bitonic sort Algorithm and Analysis.

Course Goals:

The goal is to provide students with solid foundations to deal with a wide variety of computational problems, and to provide a thorough knowledge of the most common algorithms and data structures.

Faculty:

Section #	Instructor Name	Office
1,2	**Iyad Jaber**	TEC319

Office Hour:

Day	Hours	Office
T,R	09:30- 11:00	TEC319
T	12:30- 14:00	TEC319
M	08:00- 08:30	TEC319
W	10:00- 11:00	TEC319

Text Book/ Reading:

Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Introduction to Algorithms, McGraw Hill and MIT Press, 1990.

Introduction to Algorithms and Java CD-ROM, 2nd Edition, Thomas H Cormen, Charles E Leiserson, Ronald L Rivest, and Clifford Stein, ISBN-13 9780072970548.

Methods of Instruction:

Lectures **and 4 engaging programming projects**.

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Grading Criteria:

Midterm exam	**30%**
4 projects	**30%**
Final exam	**40%**

Special Regulations:

- Late assignments will lose 10 points out of 30 for one class period.
- Missing any exam without an **acceptable** excuse will result in a zero grade for that exam.
- Academic **honesty**:
  - Individual HW assignments must be each student’s own work.
  - Cheating will result an official university disciplinary review.

Topics Covered in this Course:

#	Description	# of Lectures (1.5 hours)
1	Review of algorithm design and analysis asymptotic time and space complexities	2
2	Divide and Conquer, Recursion, Recurrence equation	2
3	Dynamic Programming: matrix chain multiplications, longest common sequence.	3
4	Greedy Algorithms	3
5	Huffman Coding	1
6	String Matching Algorithm	1
Projects 1 & 2 discussion		1
7	Graph Algorithms	5
Midterm Exam (30%)		
7	Searching, Backtracking, Branch and Bound	3
8	Games Tree and Algebraic Algorithms	2
9	Parallel Processing (SISD, MISD, SIMD, MIMD), Parallel Processing Topologies, Bitonic sort Algorithm and Analysis.	5
Projects 3 & 4 discussion		1
Final Exam (40%)		

Good Luck!

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