אוניברסיטת בר-אילן

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Computer Structure and Architecture

83-301

Shmuel wimer

Course format: Lectures and Training

Second Semester 2019/20 **Weekly hours**: 3 lecture + 1 practice

1) **Course objectives**:

This course is CE compulsory and EE elective. It follows "Introduction to Computers and Logic Design", taught at the 2nd year and compulsory for both CE and EE. Its goal is to provide the students with a wide and deep knowledge of modern, commonly used, computers. The course emphasizes the various components of computing systems, starting from the instruction-level parallelism, followed by multi-processing and multi-threading, up to memory and storage systems. It provides the students with wide knowledge of the "big picture" of computer systems, together with design capabilities based on practical tradeoffs and constraints.

2) **Course format**:

Frontal lectures – in the classroom.
Frontal training – in the classroom.

3) **Course content**:

Week	Topic	Reading
1-2	Computer classification, architectures, trends, performance measurements, costs, design constraints.	
3	Instruction level parallelism, compilers, branch prediction.	
4-5	Static and dynamic scheduling, speculation, multiple-issue.	
6-7	Limits of instruction-level parallelism, hardware and software speculations, multi-threading.	
8	Multi processors, symmetric shared-memory architecture, distributed memory	
9	Synchronization, memory consistency.	
10-11	Memory hierarchy, technology and optimization, cache design, virtual memory.	
12-13	Storage systems, disks, I/O, reliability.	

4) **Prerequisites:**

Logic Design and Computers Introduction.

5) **Course requirements:**

4-5 homework assignments. Submission is not mandatory but highly recommended.

Final exam.

6) **Grading:**

Final exam: 100% ; Homework exercises: 0% ; Pass grade (60%) in the final exam is mandatory.

7) **Textbooks and supplementary reading:**

J. L. Hennessy and D. A. Patterson, Computer Architecture, 4nd Edition, Morgan Kaufmann.