BIRZEIT UNIVERSITY

Faculty of Information Technology

Computer System Engineering

Computer Organization and architecture

ENCS238

Instructor: Dr. Abualsoud Hanani   Spring semeter 2012/2013

Office: TEC221   Office hours: consult Ritaj

❖ Prerequisite: ENCS234 (Digital systems)

❖ Course Aims & Objectives:

The main aim of this course is to introduce the students with the basic concept of computer organization and architecture covering topics in both the physical design of a computer (Organization) and the logical design of the computer (Architecture). It also introduces students to hardware programming with Assembly language based on x86 architecture.

❖ Intended Learning Outcomes (ILOs'):

Upon successful completion of this course, students should be able to:

1. Describe various data representations and explain how arithmetic and logical operations are performed by computers

2. Describe organization of digital computers and explain the basic principles and operations of different components

3. Evaluate the performance of CPU, memory and I/O operations

4. Design a basic computer system using the major components

5. Write low-level programs to perform different basic instructions

6. Demonstrate effective presentation skills

❖ Main methods of teaching and learning:

1. lectures, discussion, (ILO 1 & 2).

2. Tests, oral presentation, projects (ILO 3 & 4).

❖ Main methods of student assessment:

1. Attendance / participation ……………………………………………….…… 5%

2. Project(s) …………………………………………………………………………… 10%

3. Quizzes ……………………………………………………………………..…. 10%

4. Oral presentation ………………………………………………………………….. 10%

5. First Exam …………………………………………………………………………… 15%

6. Second exam ……………………………………………………………………… 15%

7. Final exam …………………………………………………………………………… 35%

❖ Text book and references:

Essential reading: W. Stallings, Computer Organization and Architecture: Designing for Performance, 6th or 7th or 8th Edition.

Supplementary Reading:

• Fundamentals of Computer Organization and Architecture, Mostafa Abd-El-Barr & Hesham El-Rewini, 2005 by John Wiley & Sons, Inc.

• Computer Systems Architecture, M. M. Mano, Prentice Hall 1992, 2nd edition

• IBM PC Assembly Language & Programming, Peter Abel, Prentice Hall 5th edition

• Computer Organization & Design, Patterson & Hennessy, Morgan Kaufman 1998 2nd edition

❖ Detailed course contents:

Topics	Expected time	Chapters
Introduction & Computer Evolution	**2**	**1, 2 + Handout**
Instruction Sets Architecture - Introduction - Instruction Formats - Addressing Modes - RTL & Micro-operations RISC & CISC	**7** **1 + 1 + 2 + 2 + 1**	**10, 11, 13 + Mano Ch.4**
Computer Arithmetic - Number Representation - Addition & Subtraction - Multiplication - Floating-Point Representation Floating-Point Operations	**5** **1 + 1 +1 + 1 +1**	**9**
Central Processing Unit - CPU Instruction Cycle - Bus's & Interconnections Control Unit Design	**6** **3 + 2+ 1**	**3 + Handout**
First Exam		
Introduction to 8086 Assembly Language - 8086 Hardware Specifications - Program Structure - Input/output - Arithmetic, Logical, String Instructions - Branch & Control Instructions - Procedures - Stacks Examples	**12** **2 + 1 + 1 + 3 + 2 + 1 + 1 + 1**	**Handout**
Cache Memory - Placement Strategies - Replacement Strategies - Average Memory Access Time Write Strategies	**5** **2 + 1 + 1 + 1**	**4**

Internal Memory	**3**	**5**
External Memory	**2**	**6**
Second Exam		
Input/Output	2	7 + **Handout**
Final Exam		