



كلية الحاسبات و المعلومات



Computer Arch. & Organization Course Specifications

Faculty: Computer and Informatics

Department: Scientific Computing

Program(s) on which the course is given : Bachelor in Computer and Information Sciences

Major or Minor element of programs : All majors

Department offering the program : Scientific Computing

Department offering the course : Computer Systems

Academic year / Level : 3rd Year / B.Sc.

Date of specification approval : 20/04/2010

A. Basic Information

Title: Computer Architecture & Organization **Code:** CHW 353

Lectures: 3 hrs/week

Tutorial: ---

Practical: 2 hrs/week

Credit Hours: ---

Total: 5 hrs/week

B. Professional Information

1. Overall Aims of Course:

This course will provide an overview of the structure and function of computers at the register level and how data is represented at this level. It will introduce assembly language as a way of describing the functionality, but will not require students to



become proficient assembly language programmers. The course will demonstrate how the execution of the basic constructs takes place at the register level.

2. Intended Learning Outcomes of Course (ILOs):

a. Knowledge & understanding of:

- a1- Demonstrate the principles of computer systems, including architecture, networks and communications.
- a2- Know and understand the principles and techniques of a number of application areas informed by the research directions of the subject, such as computer interfacing and computer graphics.
- a3- Show a critical understanding of the physical, electronic, architecture principles underlying hardware design
- a4- Understand the principles computer programming, networking, computer organization, computer architecture, networks, artificial intelligence, graphics, computer interfacing, databases, embedded applications and computer and network security and operating systems.
- a5- Illustrate the differences between main architectural families of microcontrollers

b. Intellectual skills:

- b1- Identify attributes, components, relationships, patterns, main ideas, and errors.
- b2- Summarize the proposed solutions and their results.
- b3- Identify a range of solutions and critically evaluate and justify proposed design solutions.



b4- Solve IT problems with pressing commercial or industrial constraints .

b5- Generate an innovative design to solve a problem containing a range of commercial and industrial constraints. Design and implement a software or hardware system of significant size

c. Practical skills:

c1- Use IT skills and display mature computer literacy.

c2- Specify, design, and implement IT and computer-based systems

c3- Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem .

c4- Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, and multimedia systems

c5- Use appropriate computer-based design support tools

c6- Present different data communication protocols

d. Transferable skills:

d1- Use of general ICT tools and facilities.

d2- The ability to evaluate systems in terms of general and specific quality attributes

d3- Work within and contribute to a team, apply management skills such as co-ordination, project design and evaluation and decision processes

d4- The ability to design and apply hardware solutions for computer work.



3. Contents:

Topic	No. of hours	Lecture	Tutorial/P ractical
Review some concepts from Logic Design	5	3	2
Register transfer language and bus system	5	3	2
Complete design of simple basic computer - I	5	3	2
Complete design of simple basic computer – II	5	3	
Complete design of simple basic computer – III	5	3	2
Assembly language and the corresponding assembler of the designed computer	5	3	2
CPU organization (CPU design types) : single processor register, general register organization and stack organization	5	3	2
CPU organization (instruction format): number of addresses, addressing modes and different types of instructions.	5	3	2
CPU pipelining: arithmetic pipeline, instruction pipeline and its problems.	5	3	2
I/O organization (Connection between CPU and devices): I/O interfacing, strobe, handshake and asynchronous serial transmission, memory-mapped and isolated connection.	5	3	2
I/O organization (connection between CPU, memory and devices): programming I/O, Interrupt initiated and direct memory access (DMA)	5	3	2
Memory Organization: RAM and ROM	5	3	2
Memory Organization: Cache memory	5	3	2
Revision	5	3	2