

Course specification
(2204 Computer Organization & Assembly Language)

Faculty HICIT

Programme(s) on which the course is given: Under graduate program in Computer Science

Major or minor element of programmes: Compulsory

Department offering the programme: Computer Science

Department offering the course: Computer Science

Academic year / Level: Second Year

Semester offered: Second Semester

Date of specification approval: 22/2/2016

A- Basic Information

Title: Computer Organization & Assembly Language programming

Code: 2204

Weekly Hours:

Lecture: 4 Practical: 3 Exercise:- Total: 7

B- Professional Information

1 - Overall aims of course:

The objectives of this course are to introduce the principles of Modern Computer Architecture and design. Computers are built from the following key components: Data paths, Control unit (controls everything in the CPU), Memory (main memory, cache, disk ...) to store code & data, and Input / Output mechanisms to communicate with the outside world. The first four components will be thoroughly discussed. At the end of the course students should be able to:

- Understand computer fundamentals as well as learn architecture of the digital computer
- Understand the various components of a computer processor unit and a design of control unit by using hardwired and microprogramming methods.
- Understand the memory organization.
- Write a program in Assembly Language to handle keyboard and screen processing
- Assemble and link separate programs into executable program

2- Program ILOs Covered by Course

Program Intended Learning Outcomes			
Knowledge and understanding	Intellectual Skills	Professional and practical skills	General and Transferable skills

a8, a10, a15, a18, a19	b4, b7, b8, b16	c1, c5, c6, c14	d9
------------------------	-----------------	-----------------	----

3- Intended learning outcomes of course (ILOs)

- Upon successful completion of this course, students should be able to:
- describe the functional components in processor design, register sets, instruction codes and execution, addressing modes, basic assembly code and programming;
- identify factors in the processor design to achieve performance in single and multiprocessing systems;
- explain the operations of cache and main memory, I/O operations, bus controls, I/O interrupts and interfaces, I/O devices and characteristics;
- apply the knowledge on system components and explore technological improvements in processor, memory, bus and I/O operations on the design of a typical computer system;

a- Knowledge and understanding

Upon successful completion of the course, graduates should be able to:

- a1. Outline fundamentals in computing, including hardware and operating systems.
- a2. Describe functions of the basic building blocks of a computer system.
- a3. Show a critical understanding of the broad context within computing including issues of reliability.
- a4. understand how computers execute instructions.
- a5. Explain the basic operations of cache and main memory, I/O operations, bus, interrupt and peripheral devices as well as analyzing the performance of different designs.

b- Intellectual skills

- b1. analyze various architectures and explain the design concepts for analyzing computer systems.
- b2. Sequence complete computer instructions.
- b3. analyze attributes and components of computer systems.

c- Professional and practical skills

- c1. Simulate micro instruction executions.
- c2. Specify, investigate, analyze, design and develop computer-based systems using appropriate tools and techniques.
- c3. Operate computing equipment efficiently, taking into account its logical and physical properties.

d- General and transferable skills

- d1. Work in stressful environment and within constraints.
- d2. Manage tasks and resources.
- d3. Communicate effectively.

4-Contents

Topic	Hours	Lec. Hours	Exc /Lab
I Introduction to Computer Organization & Architecture, Basic Computer Components, Computer Assembly language Programming	14	8	6
Interconnection Structure & Bus Architecture Overview	7	4	3
A Top-Level View of Computer Function and Interconnection	7	4	3
Computer basic unit organization: Memory Design(1), (2)	14	8	6
Interrupt Handling Mechanism.	7	4	3
Computer cycles: Fetch, Decode, Execute	7	4	3
Processor Organization, Register Organization & Design Issues.	7	4	3
Processor Organization & Instruction Sets: Characteristics and Functions	7	4	3
Processor Organization, Addressing Techniques	7	4	3
I/O devices Interfacing	14	8	6

5- Teaching and learning methods

- 5.1 Lectures
- 5.2 Tutorial Exercises
- 5.3 Practical Lab
- 5.4 Discussions.

6- Student assessment methods

- 6.1 Midterm Exam: To assess the knowledge and understanding achieved by the student during the previous weeks.
- 6.2 Final Exam: To evaluate what the student gain at the end of the course, and to assess: the knowledge and understanding, general skills, and intellectual skills.
- 6.3 Course Work & Quizzes: To keep the student always in the course, and to evaluate knowledge, understanding, intellectual, and transferable skills.

Assessment Schedule

Assessment	Week #
Mid Term Exam	8
Final Exam	16
Course Work & Quizzes	2-14

Assessment Weight

Assessment	Weight %
Mid Term Exam	10%
Final Exam	80%
Course Work & Quizzes	10%
Total	100

Course Work & Quizzes: (Short Exams, Assignments, Researches, Reports, Presentations, Class/Project discussion)

7 -List of references

7.1 -Course notes

- Teacher notes on Computer Organization & Assembly Programming (free of charge)

7.2 -Essential books (text books)

1. Computer Organization and Architecture by WILLIAM STALLINGS, Prentice Hall 9th Edition
2. IBM Assembly Language and Programming by Peter Abe, Prentice Hall

8- Facilities required for teaching and learning

Computer laboratories: equipped with suitable number of PC computers

Computer Classrooms: equipped with PC computer +Data show + Screen
White board and colored pens.

Software required: Turbo Assembly / Microsoft Assembly

9-Course Matrices

9.1-Course Content/ILO Matrix

Course Contents	a1	a2	a3	a4	a5	b1	b2	b3	c1	c2	c3	d1	d2	d3
I Introduction to Computer Organization & Architecture, Basic Computer Components, Computer Assembly language Programming	√													
Interconnection Structure & Bus Architecture Overview		√												
A Top-Level View of Computer Function and Interconnection			√											
Computer basic unit organization: Memory Design(1), (2)				√										
Interrupt Handling Mechanism.						√	√			√	√			
Computer cycles: Fetch, Decode, Execute					√		√	√			√			
Processor Organization, Register Organization & Design Issues.									√	√	√			

9.2-Learning Method /ILO Matrix

Learning Methods	a1	a2	a3	a4	a5	b1	b2	b3	c1	c2	c3	d1	d2	d3
Lectures	√	√	√	√	√	√	√	√	√	√	√			
Tutorial Exercises						√	√	√	√	√	√			
Practical Lab						√	√	√	√	√	√			
Discussions.						√	√	√	√	√	√	√	√	√

9.3 Assessment Methods /ILO Matrix

Assessment Methods	a1	a2	a3	a4	a5	b1	b2	b3	c1	c2	c3	d1	d2	d3
Mid Term Exam	√	√	√	√	√	√	√	√	√	√	√			
Final Exam	√	√	√	√	√	√	√	√	√	√	√			
Course Work & Quizzes	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Course coordinator: Dr Mohamed EL-Zeweidy ()

Head of Department: Dr. Farouk Shabaan ()

Date: 22/2/2016