QFO-AP-FI-MO02	Course Syllabus :اسم النموذج	جامعة فيلادلفيا Philadelphia University
رقم الاصدار : 1 (Revision)	الجهة المصدرة: كلية تكنولوجيا المعلومات	
التاريخ :2017/11/05	الجهة المدققة: عمادة التطوير والجودة	
عدد صفحات النموذج:		

Course Title: Computer Organization and Design	Course code: 750233
Course Level: 2	Course prerequisite (s): 750230
Lecture Time:	Credit hours: 3

Academic Staff Specifics

Name	Rank	Office Number and Location	Office Hours	E-mail Address

Course module description:

The module emphasizes on the following topics: Digital components used in the organization and design of digital computer, machine level data representation, design an elementary basic computer, organization and architecture of a simple central processing unit, register transfer language, instruction types, assembly language.

Course module objectives:

The aim of this course is to introduce the organization of digital computers, their basic components (design and functionalities) , and their low-level programming.

Course/ module components:

- **Data Representation**
- **Basic Digital Building Blocks**
- **Basic Computer Organization**
- **Instruction Types.**
- **Central Processing Unit.**

TextBook

The Essentials of Computer Organization and Architecture, Linda Null, Julia Lobur, Jones and Bartlett Publishers, 2012

Support material (s): Textbook slides, Academic CPU simulator

Teaching Methods:

Duration: 16 weeks, 48 hours in total
Lectures & Exams: 42 hours
Tutorials: 3 hours
Laboratory sessions: 3 hours

Learning Outcomes

A- Knowledge and understanding

A2. Know & understand a wide range of principles and tools available to Minimize functions

using any type of minimizing algorithms (Boolean algebra, Karnaugh map the software developer, such as design methodologies, choice of algorithm, language, software libraries and user interface technique:

A4. Know & understand a wide range of hardware used in development of computer systems, such as describing the function of the major components of digital computers, List the components and describe the basic structure of Central Processing Units, recall and explain the Von Neuman model of digital computers, list and explain the various instructions formats and instruction type, explain the concept of CPU instruction set architecture (ISA and explain the difference between computer organization and computer architecture (A4)

A5. Know & understand the professional and ethical responsibilities of the practicing computer professional including understanding the need for quality.

B- Intellectual skills (thinking and analysis).

B1. Analyze a wide range of problems and provide solutions through suitable algorithms, structures, diagrams, and other appropriate methods

B4. Practice self learning by using the e-courses

C- Practical skills

C3. Work effectively with and for others.

C4. Strike the balance between self-reliance and seeking help when necessary in new situations

C5. Display personal responsibility by working to multiple deadlines in complex activities

D- Transferable Skills

D2. Prepare and deliver coherent and structured verbal and written technical reports.

D4. Use the scientific literature effectively and make discriminating use of Web resources

D5. Design, write, and debug computer programs in appropriate languages

Learning outcomes achievement

- Development: A2, A4, and A5 are developed through the lectures and laboratory sessions.

B1, D5, C3, and C4 are developed trough Tutorials and Lab sessions,

B4, D2, D4, D5, and C5 are developed through Homework

- Assessment : A2, A4, A5, B1, D5, and C4 and are assessed through Quizzes, written exams, and Practical Works Exams.

B4, D2, D4, D5, and C5 are assessed through Homework Exam.

Practical and subject specific skills (Transferable Skills).

20. Use simple academic digital computer simulator (C6)
21. Write, test and debug simple assembly programs (C5)
22. Use system software tools (editor, linker, assembler, debugger) (C6)

Assessment of Learning Outcomes

Learning outcomes (1-12) are assessed by examinations, tutorial, quizzes. Learning outcomes (13-22) are assessed by assignments, reports, and practical projects

Assessment instruments:

Allocation of Marks	
Assessment Instruments	**Mark**
First examination.	**20**
Second examination.	**20**
Final examination.	**40**

Quizzes, and Home works.	**20**
Total	**100**

** Make-up exams will be offered for valid reasons only with consent of the Dean. Make-up exams may be different from regular exams in content and format.*

Practical Submissions:

The assignments that have work to be assessed will be given to the students in separate documents including the due date and appropriate reading material.

Course/module academic calendar

Week	Basic and support material to be covered	HomeWorks/Reports (Due Dates)	
(1)	**Introduction** **Lecture1:** Computer organization versus computer architecture Main components of a computer Principle of equivalence between software and hardware **Lecture2:** Look inside a computer Standards and Organizations Computer level hierarchy **Lecture3:** Von Neuman Model Non Von Neuman Models		
(2)	**Review of basic Digital Circuits** **Lecture4:** Logic Gates. Boolean Functions. **Lecture5:** Combinational Circuit (half adder, full adder) Decoders and Multiplexers. **Lecture 6:** Registers and Counters		
(3)	**Data Representation** **Lecture7:** Numbering Systems		

	Digital to Binary conversion Binary versus Hexadecimal representation **Lecture8:** Signed versus unsigned numbers Signed integer Representation Binary Arithmetic (1) **Lecture 9:** Binary Arithmetic (2)		
(4)	**Data Representation** **Tutorial** **Lecture11:** Floating Point Representation (1) **Lecture12:** Floating Point Representation (2)		
(5)	**Data Representation** **Tutorial** **Lecture13:** Character Representation (1) **Lecture14:** Character Representation (2)	**Quiz1**	
(6)	**Introduction to a Basic Computer** **Lecture15:** CPU Basics, Buses, CPU clock **Lecture16:** Input/Output SubSystem Memory Organization (1) **Lecture17:** Memory Organization (2)		
(7)	**First Exam** **Lecture18:** Memory Organization (3) Interrupts		

	First Exam Correction		
(8)	**Lecture19:** Marie: A simple academic oriented CPU (1) **Lecture20:** Marie: A simple academic oriented CPU (2) **Lecture21:** Instructions Processing (1)		
(9)	**Lecture22:** Instructions Processing (2) Discussions on Assembler **Lecture23:** Register Transfer Language **Lecture 24:** Discussions on decoding (1)		
(10)	**Lecture25:** Discussions on decoding (2) **Lecture26:** Discussions on decoding (3) **Laboratory Session**	**Quiz2**	
(11)	**Instruction Set Architecture** **Lecture27:** Instructions Formats (1) **Lecture28:** Instructions Formats (2) Instruction Types **Lecture 29:** Addressing (1)		

(12)	**Lecture30:** Addressing (2) **Tutorial** **Second exam**		
(13)	**Lecture31:** Assembly Programming **Second Exam Correction** **Tutorial**	**Quiz3**	
(14)	**Laboratory Session** **Laboratory Session** **Lecture32:** Examples of Real World CPUs		
(15)	**Lecture 33:** Examples of Real World ISA (1**)** **Lecture 34:** Examples of Real World ISA (2) **Lecture35:** Overview on Pipelining	**Project Due Date**	
(16)	**Projects Presentation** **Final Exam**		

Expected workload:

On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Attendance policy:

Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

Module references:

a) Books:

- Computer System Architecture and Organization; M. Usha, T.S. Srikanth; Wiley_india; 2013

- Computer Organization and Architecture: Designing for Performance;W. Stallings; Prentice Hall. 9th Edition, 2012

- Fundamentals of Computer Organization And Architecture**.** Mostafa Abd-El-Barr, Hesham El-Rewini. John Wiley and Sons**,** 2005, 2nd edition.

- The Architecture of Computer Hardware and System Software, Irv Englander, John Wiley and Sons**,** 2000, 2nd edition

- Computer Organization and Design: The Hardware/Software Interface, David A. Patterson and John L. Hennessy, Morgan Kaufmanns, 1998

- Computer System Architecture; M. Morris Mano; Prentice Hall; 1998.

b)**Websites:**

1) http://williamstallings.com/COA6e.html

2) http://www.ece.eng.wayne.edu/~gchen/ece4680/lecture-notes/lecture-notes.html

3) http://computerscience.jbpub.com/ecoa/3e/