Ministry of Higher Education
PKFokam Institute of Excellence
Department of Computing and Software Engineering

Course Code: CS 3501
Course Name: Computer Organization and Architecture

SYLLABUS

Instructor: Mr. Roger Corneille NDJEUMOU NGASSI
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Credit Hours: 3
Required grade: B
*Pre-requisite***:** MATH 1302, MATH 1190

Required course materials:

Required Text:	Andrew S. Tanenbaum, Todd Austin. *Structured Computer Organization* (6th Edition). Pearson, 2013. Hyde, Randall. *The art of Assembly language* (2nd Edition). No Starch Press, San Francisco, 2010. ISBN 978-1-59327-207-4 (pbk)
Recommended Text:	Jo Van Hoey. *Beginning x64 Assembly Programming: From Novice to AVX Professional*. Hamme, Belgium. 2019. ISBN-13: 978-1-4842-5075-4 (pbk) www.tutorialspoint.com www.guru99.com

Course Description:
The course gives an overview of basic computer organization. Computer arithmetic is also studied through the representation of numbers in binary, hexadecimal, decimal number conversions, binary number arithmetic and IEEE binary floating-point number standard. The different levels that constitute the modern computers are analyzed in details, through the three main components of a computer (central processing unit, Memory, Input/output devices and their interconnexions). Digital logic level, microarchitecture level, Instruction Set Architecture (ISA) level, operating system level, assembly language level and problem-oriented language level.

Course Objectives and Learning Outcomes
At the end of this course, the student should be able to:

1. Describe what we mean by structured computer organization discuss some historical developments, the state of the art, and some important examples.

2. Demonstrate in-dept knowledge of processors, memories, input/output devices, and their interconnection.
3. Examine the aspects of digital logic, as a building block for the study of higher levels.
4. Examine some fundamental circuits that can be built using gates in simple combinations, including circuits for doing arithmetic.
5. Explain how gates can be combined to store information, that is, how memories are organized.
6. Discuss how single-chip CPUs interface with memory and peripheral devices.
7. Discuss the Microarchitecture level, and the Instruction Set Architecture (ISA) level, and the Operating System level in detail.
8. Show an understanding of the assembly language level and write simple programs in assembly language.

Grading Policy

- Class Standing (60%)

Attendance	Assignments	Quizzes	Projects
10%	**10%**	**20%**	**20%**

- Evaluations (40%)

Test 1	Test 2	Final Examination
10%	**10%**	**20%**

Course Outline and Tentative Class Calendar

Week	Chapter	Content	Activities
30/08/2021 TO 03/09/2021	1. INTRODUCTION	1.1. Structured Computer Organization 1.2. Milestones in Computer Architecture 1.3. The Computer Zoo 1.4. Example of Computer Families	• Assignment
06/09/2021 TO 10/09/2021	2. COMPUTER SYSTEMS	2.1 Processors 2.2 Primary Memory 2.3 Secondary Memory 2.4 Input/Output	• Assignment • Quiz – Chapter 1
13/09/2021 TO 24/09/2021	3. DIGITAL LOGIC LEVEL	3.1 Gates and Boolean Algebra 3.2 Basic Digital Circuits 3.3 Memory 3.4 CPU Chips and Buses 3.5 Example of CPU Chips 3.6 Example of Buses	• Assignment • Quiz – Chapter 2

		3.7 Interfacing	
27/09/2021 TO 08/10/2021	4. THE MICROARCHITECTURE LEVEL	4.1 An Example Microarchitecture 4.2 An Example ISA: IJVM 4.3 An Example Implementation 4.4 Design of the Microarchitecture Level 4.5 Improving Performance 4.6 Examples of the Microarchitecture Level	• Test 1
11/10/2021 TO 15/10/2021	5. THE INSTRUCTION SET ARCHITECTURE LEVEL	5.1 Overview of the ISA Level 5.2 Data types 5.3 Instruction Formats 5.4 Addressing 5.5 Instruction Types 5.6 Flow if Control 5.7 A detailed Example: The Towers of Hanoi 5.8 The IA-64 Architecture and the Itanium 2	• Project 1 • Quiz – Chapter 4
18/10/2021 TO 29/10/2021	6. THE OPERATING SYSTEM LEVEL	6.1 Virtual Memory 6.2 Hardware Virtualization 6.3 OSM Level I/O Instructions 6.4 OSM Level Instructions for Parallel Processing 6.5 Example of Operating Systems	• Assignment • Quiz – Chapter 5
01/11/2021 TO 05/11/2021	7. THE ASSEMBLY LANGUAGE LEVEL	7.1 Introduction to Assembly Language 7.2 Macros 7.3 The Assembly Process 7.4 Linking and Loading	• Test 2 • Project 2
08/11/2021 TO	8. ASSEMBLY LANGUAGE PROGRAMMING	8.1.	• Laboratory

19/11/2021			
22/11/2021 TO 26/11/2021	9. PARALLEL COMPUTER ARCHITECTURES	9.1. On-chip Parallelism 9.2. Coprocessors 9.3. Shared-Memory Multiprocessors 9.4. Message-Passing Multicomputer 9.5. Grid Computing	• Laboratory
29/11/2021 TO 10/12/2021	PROJECT PRESENTATIONS AND REVISION		• Test 3
13/12/2021	FINAL EXAM		

Class Rules

1. All existing PKFokam Institute general policies will apply.
2. Students must obtain an overall mark of at least 80% (grade B) to pass the course.
3. Students must be punctual in attending their classes.
4. No student shall be admitted after 15 minutes.
5. Absence must be justified with a note from the Admissions Officer and/or any other valuable document.
6. Late assignments are NOT accepted.
7. No cellphones and laptops during quizzes and discussions UNLESS required by the instructor.
8. Cheating during quizzes, tests and final examination will be sanctioned by a zero (0).