COVENANT UNIVERSITY
FORMAT FOR COURSE COMPACT
2019/2020 Academic session

College: College of Engineering
Department: Electrical and Information Technology
Programme: Computer Engineering
Course Code: CEN 522
Course Title: Microprocessor Systems and Interfacing
Units: 3
Course Lecturer: Dr. Joke Badejo & Engr. Omoruyi Osemwegie
Semester: Omega
Location: EIE Building, CEN Class

A. COURSE DESCRIPTION

This is an introduction to a basic microprocessor system and interfacing with emphasis on computer engineering concepts. This module introduces the student to the essential operation of a microprocessor system. To introduce the principles of microprocessor systems and to present fundamental concepts associated with microcontroller and microprocessor interfacing and system integration. It will include an introduction to the programming model in real and protected mode: registers, memory, addressing modes, and organization of the interrupt system. Memory interfacing, address decoding, and I/O interfacing: memory-mapped I/O, isolated I/O, bus timing, I/O instructions. Peripheral devices interfacing of types 8255 PPI/6821 PIA, 8251 USART/6821 UART, DMA, Timer/Counter chips, etc. Instruction set, Assembly language Programming of INTEL, and MOTOROLA microprocessors. This module is to provide the practical and theoretical skills needed to understand and program microprocessor systems and interfacing with the typical system sample of IBM PC, Apple Macintosh.

B. COURSE OBJECTIVES:

A student who successfully fulfills the course requirements will have demonstrated:

- An understanding of how to program a microprocessor in assembly language,
- Demonstrate a better understanding of hardware interconnections among subsystems of a complete microprocessor system;
- Appreciate the importance of data transfer cycle timing diagrams associated with a microprocessor system;
- Design hardware and software associated with the use of peripheral devices in conjunction with a microprocessor;
- Demonstrate a better understanding of the use of microprocessors in embedded system applications and the inherent problems.
- An ability to interface a microprocessor to various devices.

C. METHOD OF LECTURE DELIVERY/TEACHING AIDS

Lectures, classes and laboratories

D. COURSE OUTLINE

Weeks	Modules of the course	Amount of Hours	Reference Books:
1	2	3	4
1	**Module 1.** A basic microprocessor system: the CPU, memory, I/O, and buses subsystems.	2	
2	**Module 2.** Basic operation of a microprocessor system: fetch and execute cycle, the architecture of some typical 8-bit, 16-bit microprocessors (INTEL, MOTOROLA) and their features	2	
3	**Module 3.** Programming model in real mode: registers, memory, addressing modes.	2	
4	**Module 4.** Organisation of the interrupt system, interrupt vectors, and external interrupts, implementation of single and multiple interrupts in real mode.		
5	**Module 5.** Programming model in protected mode: Registers memory management and address translation, descriptor and page tables,	2	
6	**Module 6.** system control instructions, multitasking, and memory protection, addressing modes, and interrupt system.	2	
7	**Module 7.** Memory interfacing and address decoding. I/O interfacing: memory mapped i/o, isolated i/o, bus timing, i/o instructions.	2	
8	**Module 8** Peripheral devices interfacing: 8255 PPI/6821 PIA, 8251 USART/6821 UART, DMA, Timer/Counter chips, etc.	2	
9	**Module 9** Instruction set. Assembly language Programming of INTEL and MOTOROLA microprocessors.	2	
10	**Module 10** Discussion of a typical system e.g. IBM PC, Apple Macintosh.	2	

E. TUTORIAL

Assembly language programming techniques, Interface hardware design and general computer engineering concepts.

F. STRUCTURE OF THE PROGRAMME/METHOD OF GRADING

1.	**Continuous assessment**	**30 marks**
	Class test	10 marks
	Mid-session Exam	20 marks
2.	**Examination**	**70 marks**

G. CLASS BEHAVIOUR

Please, note the following:

- Mandatory 90% class attendance
- No eating in the classroom
- Active participation in all activities
- All class assignments to be submitted on time
- Punctuality to classes to be observed

H. TOPICS FOR TERM PAPERS/ASSIGNMENTS

Through the combination of homework assignments and laboratory experiments, students will learn how to:

(a) Design software for microcontroller applications,

(b) Design interface hardware for microprocessor systems,

(c) Interface hardware design, and general computer engineering concepts

(d) Programming of the Microprocessor using Assembly Language.

I. ALIGNMENT WITH COVENANT UNIVERSITY VISION

Capacity Building, possibility mentality and self reliance

J. INDUSTRY RELEVANCE

Microprocessor has a wider usage in most commercial and industrial electronic equipment mostly in microcontrollers

K. Recommended Literatures/books

1. Microprocessors and Interfacing: programming and Hardware by Dougtlas V. Hall – 1992

2. The Winn L. Rosch Hardware Bible by Winn L. Rosch - 1994

3. Embedded Systems Design with 8051 Microcontrollers: Hardware and Software by James J. Hunt.

4. Embedded Systems Design: An Introduction to Processes, Tools & Techniques by Arnold S Berger

5. The HIDOORS Methodology: Using Java in Real time and Embedded Systems by James J. Hunt – 2005

6. Real-time Systems and Programming Languages by BURNS, A. and WELLINGS, A., 2001

7. Structured Computer Organisation, Prentice Hall by A S Tanenbaum,

8. Real-Time Rendering, A K Peters T Moller & E Haines,

9. J L Antonakos, An Introduction to the Intel Family of Microprocessors, Prentice Hall (3rd edn)

10. Computers, Computer Systems and Networks by B. Kagan – 1988

11. Microprocessors and Programmed Logic, Kenneth L. Short