National University
of Computer & Emerging Sciences

Course Outline of BS (CS) Degree Program

Course Title		Computer Organization and Assembly Language	**Course Code**	EL 2003
Pre-Requisites		Digital Logic Design	**Credit Hours**	3
Text Book	**Title**	Assembly Language for Intel-Based Computers (7th Ed)		
	Author	Kip R. Irvine		
	Publisher	Pearson Education Inc. (*ISBN 978-0-07-338065-0*)		
Reference Book	**Title**	Assembly Language Programming and Org. of the IBM PC		
	Author	Ytha Yu, Charles Marut		
	Publisher	McGraw Hill		

Week	Course Contents/Topics
1.	Lab Introduction, Course Introduction, Introduction to Assembly Language and Introduction to Basic Concepts
2.	Introduction to ISA set Architecture, Loading and Executing a Program x86 Processors, 32-Bit x86 Processor, Assembly language software guideline, configuration.
3.	Assembly Language Fundamentals: Basic Language Elements, Assembling Linking and Running Programs, Irvine library.
4.	Basic Program skeleton/syntax, Defining Data, Symbolic Constants. Data Transfer.
5.	Addressing and Arithmetic: Data Transfer Instructions, Addition and Subtraction, Memory segments, instruction operands, mnemonics and directives.
6.	Data Related Operators and Directives.
7.	Observing effect of arithmetic instructions on flag registers
8.	Conditional processing, Pointer, Addressing modes (direct, indirect).
9.	Conditional and unconditional branching, Loop, Nested Loop, jump instructions, stack and Procedure (Built-in and user defined)
10.	Procedures: Stack, Stack, PUSH and POP Operations, Defining and Using Procedures, Nested Procedure Calls and their Stack Implementation, CALL and RET Instructions
11.	**MID I**
12.	Arithmetic instructions, Data Related operators, Addressing modes, effect of flag registers, conditional processing, Basic stack and procedures concepts
13.	Integer Arithmetic: SHIFT and ROTATE Instructions,
14.	Multiplication and Division Instructions: MUL, IMUL, DIV, IDIV Advanced Procedures: Introduction, Stack Frames
15.	Stack Frames, Recursion, INVOKE, ADDR, PROC, PROTO Directives
16.	Strings and Arrays: 2D Arrays

17.	High Level Language Interface: Introduction, .model directive, Inline Assembly Code
18.	Course Review, Projects' Evaluations, Final Exams

Pre-Requisites:

Students enrolled in this course are expected to have completed following courses:

1. Introduction to Computer Science, Digital Logic Design
2. Fundamental programming skills (Computer Programming)

Marks Distribution (Theory 75%, Lab 25%):

Mid Terms ……..……. 16%
Lab Tasks …….…..... 24%
Project …… 10%
Final …….50%

Plagiarism:

Marks will be deducted and the case shall be reported to the HOD and/or DC.

Rules & Regulation:

Rules and regulations related to attendance, all type of exams, class work, homework and others shall be observed as issued by the HOD CS department or in absence of the same as communicated by the course instructor during the semester.

Instructor Name: Rukhsar Ali

Instructor Signature: _____

Date: 23rd August, 2022