Course Specification

International Islamic University Chittagong
Faculty of Science and Engineering
Department of Electrical and Electronic Engineering

I. Basic Information

Course Title	:Microprocessor & Interfacing
Course Code	:EEE 3505
Pre-requisite	:Digital Electronics
Credit	:3
Academic Session	:Autumn 2020
Level	:Basic
Category	:Major
Number of lectures	:45 (18 before Mid-term, 25 after Mid-term)

II. Professional Information

Overall aim of the course	
Rational	This course provides the students basic knowledge of microprocessor and its interfacing techniques. It develops the programming capability of the students with assembly language for various practical applications using microprocessor.
Course objective	a) To understand the concept of 8086 microprocessor, its architecture, operation and interfacing with other ICs b) To develop the ability of assembly language programming using instruction set c) To be familiar with possible microprocessor based design, operation for the practical applications.
Course Synopsis	This course introduces the students to the basics of microprocessor and microcontroller. It especially provides the fundaments of 8086-microprocessor, its architecture and operation. It familiarizes the students interfacing techniques with memory, keyboard and display devices in conjunction with different integrated circuits. Moreover, it enables the students with the knowledge of assembly language programming using various instruction set. The course also helps the students to develop the skills of designing microprocessor-based system.

III. Learning Outcomes

Students learning time (Total 128 hours)	
a) Face to face	45 hours (lectures including class tests)
b) Independent	86 hours (Library, internet, assignments, home study etc.)

Intended learning outcomes (ILOs) of the course/ Course Outcome (CO)		
At the end of the course the students will be able to:		
i)	Students will be able to **explain** the architecture and operation of microcomputer and microprocessor.	Cognitive / Understanding
ii)	They will **learn** assembly language programming.	Cognitive / Understanding
iii)	They will be able to **design** various microprocessor-based systems according to practical applications.	Cognitive/ Create

IV. Lecture/Lesson Plan

Content Outline of The Course			
Weeks	**Topics**	**No of Lectures**	**Reading Materials**
1	**Introduction to Microcomputer** Microcomputer architecture, organization and its operation. Difference between Microprocessor and Microcontroller.	1	[1]+Lecture Notes
	Introduction to Microprocessor Evolution of Microprocessor, General Architecture, system bus	2	[1]+[2]+Lecture Notes
2	**Functional units of Microprocessor** ALU, Control Unit, Register array, CISC and RISC structure.	1	Lecture Notes
	Microprocessor Operation Instruction execution, memory array design and memory interfacing.	2	[2]+Lecture Notes
3	**Intel 8086 Microprocessor** 8086 architecture, Bus interface Unit, Execution Unit,	1	[1]+[2]+Lecture Notes
	8086 Registers Segment and others registers, pointers registers, Flag registers	2	[2]+Lecture Notes
4	**Class test on selected topic**	1	**CT-1**
	8086 Addressing Modes Data addressing modes, program memory-addressing modes and stack memory-addressing modes.	2	[2]+Lecture Notes

5	**Instruction Set of 8086 Microprocessor** Operation of all data movement and arithmetic instructions	3	[2]+Lecture Notes
6	**Assembly Language Programming** Assembly language programming using Instruction Set.	3	Lecture Notes
Mid-Term Examination: 30 marks, Time: 1.5hrs; Should answer any three questions out of four. Each question will carry 10 marks. There might be two/ three parts in each question.			
7	**Logic and Program Control Instructions** Operation of all logic and program control instructions, Assembly language programming using Instruction Set.	3	[2]+Lecture Notes
8	**Pin functions and operation 8086 Microprocessor** Modes of operation and Pin functions of 8086 microprocessor.	3	[2]+Lecture Notes
9	**Operation of 8284A** Pin functions and operation of 8284A	3	Lecture Notes
10	**Intel 8086 Interfacing with 8255 PPI** Introduction to Programmable Peripheral Interface (8255), Architecture	3	[3]+Lecture Notes
11	**Introduction to 8255 PPI** Operation, Programming with 8255 PPI	1	[3]+Lecture Notes
	Intel 8086 Interfacing with 8254 PIT: Introduction to Programmable Interval Timer (8254), Architecture	2	Lecture Notes
12	**Class test on selected topic**	1	**CT-2**
	8254 PPI Operation Operation, Programming with 8254 PPI	2	Lecture Notes
13	**Introduction to 8259 PPI** Architecture, operation and programming of Programmable Interrupt Controller (8259)	3	Lecture Notes
14	**Keyboard and Display Interfacing** Interfacing with ADC0804, Keyboard and Display Interface (8279), DMA.	3	[4]+Lecture Notes
15	**Revision, Case Study and Independent Learning**	3	

Final Examination: 50 marks; Time: 2.5 hrs; Should answer any five questions out of seven. Each question will carry 10 marks. There may be two/ three parts in each question.

Recommended Books:

1.	Douglas V. Hall, Microprocessors and interfacing, 3rd ed., India: Tata McGraw Hill, 2012.
2.	Mohamed Rafiquzzaman, Microprocessors and Microcomputer-Based System Design, 2nd ed., India: CRC Press, 1995.
3.	Ramesh S. Gaonkar, Microprocessor Architecture, Programming, and Applications with the 8085,6th ed., India: Penram International Publishing, 2013.
4.	Myke Predko, Programming and customizing the PIC microcontroller,1st ed., India: Tata McGraw-Hill, 2007

V. Teaching and Learning Methods

Facilities required for teaching and learning:	
White board, Marker, Laptop, and Multi -Media projector.	
Teaching and learning methods:	
For theoretical courses	a. Lecture b. Class Discussion d. Assignment e. Class Test

VI. Student Assessment Methods

For the Theoretical Course	***CIE(Continuous Internal Evaluation):***	a. Attendance b. Class Test /Quiz/ Assignments/Sudden Test c. Mid-term Exam
	SEE (Semester End Examination):	Final Exam

Weighting of Assessments		
Method	**Marks%**	**Relevant Course Outcomes (CO)**
Class Attendance	10	NA
Assignment /ST/ Class Test(**CT**)	10	CO1
Midterm Examination	30	CO1,CO3
Final Examination	50	CO1,CO2, CO3
TOTAL	**100**	

Assessments		
Assessment Method	**Assessment Schedule**	**Marks**
Class Test 1	4th week	**10**
Midterm	7th week	30
Assignment (Optional)	9th week	**10**
Class Test 2	12th week	**10**
Final exam	16th week	50
Course Outcomes (CO) Assessment		
Course Outcomes (CO)	**Assessment Schedule**	**Assessment Method**
CO1	4th week	CT-1/Mid Term Exam
CO2	14th week	CT-2/ Final Exam/Assignments
CO3	7th /16th week	Mid/Final Exam/ Assignments
To achieve a specific outcome of a course, a student has to achieve 60% marks for a CO.		

VII. Mapping of CO Vs. PO

Mapping of Course Outcomes to the Programme Learning Outcomes												
Course Outcome	**Program Outcomes (POs)**											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	√											
CO 2		√										
CO 3			√									

PO1: Engineering Knowledge

PO2: Problem Analysis

PO3: Design/ Development of Solution

PO4: Investigation

PO5: Modern tool usage

PO6: The Engineer and society

PO7: Environment and sustainability

PO8: Ethics

PO9: Individual work and team work

PO10: Communication

PO11: Project management and finance

PO12: Lifelong learning

	Rubrics for Assignments			
Category	**Very Good**	**Good**	**Average**	**Poor**
Accuracy	All of the answers are correct.	Most of the answers are correct.	Some of the answers are correct.	None of the answers is correct.
Timeliness	Received in due time	Received 1 hour late.	Received 2 hour late.	Received more than 2 hours late.
Work Shown	Showed all steps	Showed most of the steps.	Showed some of the steps.	Did not show the steps.

Prepared by:

Dr. Sikder Sunbeam Islam
Associate Professor
Department of Electrical and
Electronic Engineering, IIUC