B.E. Semester: 4
Electronics & Communication Engineering
Subject Name: Microprocessor Architecture & Interfacing
Subject Code: EC-404

A. Course Objective:

- To understand the basics and evolution of microprocessors.
- To study about the functional components of *8085* in detail. To understand the interrupt handling of 8085.
- To study the various types of instructions provided by 8085 and addressing Modes.
- To Study concepts of Interfacing Module like 8255, 8279,8237,8253,8251 and 8259.

B. Teaching / Examination Scheme :

SUBJECT		Teaching Scheme				Total Credit	Evaluation Scheme					Total Marks
		L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
CODE	NAME	Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
EC-404	Microprocessor Architecture & Interfacing	4	0	2	6	5	3	70	30	20	30	150

C. Detailed Syllabus :

1. **Introduction to 8085 Microprocessor:** Introduction to microprocessor, Functional Component of microprocessor, Evolution of Microprocessor, Microprocessor systems with bus organization, Microprocessor Architecture & Operations, Memory, I/O Device, Memory and I/O Operations.
2. **The 8085 Microprocessor Architecture:** 8085 Microprocessor Architecture, Address, Data And Control Buses, Properties of 8085 microprocessor, Pin Functions of 8085 microprocessor, Demultiplexing Of Buses, Generation Of Control Signals, Addressing Modes, Instruction Cycle, Machine Cycles, T-States, Memory Interfacing.
3. **Introduction to 8085 Instruction Sets:** Data Transfer (Copy) Operations, Arithmetic Operations, Logic Operations, Branch Operations; Programming Techniques with Additional Instructions -- Programming Techniques- Looping, Counting, & Indexing, Additional Data Transfer and 16-Bit Arithmetic Instructions, Arithmetic Operations Related to Memory, Logic Operations- Rotate, Counters & Time Delays , Stack & Subroutines , Conditional Call & Return Instructions.
4. **Programming of 8085 microprocessor:** 16 bit Addition and Subtraction, 8 bit multiplication, 8 bit Division, Find Largest and Smallest numbers form Arrays, Arrange data in Ascending and Descending order, Conversion like BCD to HEX, Hex to BCD, HEX to ASCII, Square of given Number Using Lookup Table.
5. **Interfacing with 8085 microprocessor:** Interfacing Concepts, Ports, Interfacing Of I/O Devices, Interrupts In 8085, Interfacing of Data Converters (D-To-A And A-To-D), Programmable Interfacing Devices Like 8279 Keyboard/Display Interface, 8255A PPI, 8253/8254 Timer, 8259A PIT, 8237 DMA Controller, Serial I/O Concepts, SID And SOD, 8251A USART. Interfacing of above chips With 8085, Programming them In Deferent Modes, Practical Applications.

D. Lesson Planning :

SR. No.	No. of Hours	% Weightage in Exam	Topics
1	05	10	**Introduction to 8085 Microprocessor:** Introduction to microprocessor, Functional Component of microprocessor, Evolution of Microprocessor, Microprocessor systems with bus organization, Microprocessor Architecture & Operations, Memory, I/O Device, Memory and I/O Operations.
2	15	25	**The 8085 Microprocessor Architecture:** 8085 Microprocessor Architecture, Address, Data And Control Buses, Properties of 8085 microprocessor, Pin Functions of 8085 microprocessor, Demultiplexing Of Buses, Generation Of Control Signals, Addressing Modes, Instruction Cycle, Machine Cycles, T-States, Memory Interfacing.
3	15	20	**Introduction to 8085 Instruction Sets:** Data Transfer (Copy) Operations, Arithmetic Operations, Logic Operations, Branch Operations; Programming Techniques with Additional Instructions -- Programming Techniques- Looping, Counting, & Indexing, Additional Data Transfer and 16-Bit Arithmetic Instructions, Arithmetic Operations Related to Memory, Logic Operations- Rotate, Counters & Time Delays , Stack & Subroutines , Conditional Call & Return Instructions.
4	10	20	**Programming of 8085 microprocessor:** 16 bit Addition and Subtraction, 8 bit multiplication, 8 bit Division, Find Largest and Smallest numbers form Arrays, Arrange data in Ascending and Descending order, Conversion like BCD to HEX, Hex to BCD, HEX to ASCII, Square of given Number Using Lookup Table.
5	15	25	**Interfacing with 8085 microprocessor:** Interfacing Concepts, Ports, Interfacing Of I/O Devices, Interrupts In 8085, Interfacing of Data Converters (D-To-A And A-To-D), Programmable Interfacing Devices Like 8279 Keyboard/Display Interface, 8255A PPI, 8253/8254 Timer, 8259A PIT, 8237 DMA Controller, Serial I/O Concepts, SID And SOD, 8251A USART. Interfacing of above chips With 8085, Programming them In Deferent Modes, Practical Applications.
Total	60	100	

E. Instructional Method & Pedagogy :

- At the start of course, the course delivery pattern , prerequisite of the subject will be discussed
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weightage should be given to all topics while teaching and conduction of all examinations.
- Attendance is compulsory in lectures and laboratory, which may carries five marks in overall evaluation.
- One/Two internal exams may be conducted and total/average/best of the same may be converted to equivalent of 30 marks as a part of internal theory evaluation.

- Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carry an importance of ten marks in the overall internal evaluation.
- Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overall internal evaluation.
- Experiments shall be performed in the laboratory related to course contents.

F. Suggested list of Experiments :

1. Introduction about 8085 microprocessor trainer kit.
2. To perform addition/Subtraction/Multiplication and Division of two 8 bit number using 8085.
3. To Find Largest and Smallest numbers in the array of data using 8085 instruction set.
4. To write a program to convert Hex to ASCII and vice versa.
5. To write a program to convert Hex to BCD and vice versa.
6. To write a program to arrange an array of data in Ascending and Descending order using 8085.
7. To write a Program to find Square of given number using look up table technique.
8. To write a Program for Traffic Light controller using 8085 microprocessor.
9. To Study and demonstrate about interfacing of 8255A PPI (Interface) with 8085 microprocessor.
10. To Study and demonstrate about interfacing of 8253-8254 (Timer) with 8085 microprocessor.
11. To Study and demonstrate about interfacing of 8279(Keyboard and Display) with 8085 microprocessor.
12. To Study and Demonstrate about serial interfacing (8251 USART) with 8085 microprocessor.

G. Students Learning Outcomes :

On successful completion of the course

1. The student can learn about detailed aspects of 8085 microprocessor of all the areas in day to day life. Can also learn about instruction, Programming and different interfacing module using 8085 microprocessor.

H. Recommended Study Materials :

TEXT BOOK:

- Microprocessor Architecture, Programming, and Applications with the 8085 -Ramesh S. Gaonkar Pub: Penram International.

REFERENCE BOOKS:

1. Microcomputers and Microprocessors: The 8080, 8085 and Z-80 Programming, Interfacing and Troubleshooting by John E. Uffenbeck.
2. Microprocessor and Microcontroller fundamentals. The 8085 and 8051 Hardware and Software by William Kleitz.

Web Materials: http://www.wikipedia.org