SARVAJANIK UNIVERSITY
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SARVAJANIK UNIVERSITY
Sarvajanik College of Engineering and Technology
Bachelor of Technology

Year: B. Tech II (Semester III)

Subject Name: Microprocessor and Interfacing **Subject Code:** BTCO13303
Type of course: Professional Core course
Prerequisite (if any): Computer Organization
Rationale:

- To provide a basic understanding of architecture and organization of Basic Hypothetical computers.
- To give exposure regarding logical operations and micro-operations performed by digital computer systems.
- To realize the need of pipeline and vector processing in digital computer systems.

Teaching and Examination Scheme:

Teaching Scheme				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	
3	0	2	4	60	25	15	30	20	150

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests) CA2: Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems TEE: Term End Examination TEP: Term End Practical Exam (Performance and viva on practical skills learned in course) CA3: Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Content:

Sr. No.	Contents	Total Hours
1.	**Introduction To Microprocessors Evolution** Introduction to evolution Microprocessor, Microcontroller, Block diagram of microcomputer and its organization, Concept of components such as a system bus, Memory, and I/O devices	03
2.	**8085 Microprocessor architecture and organization** 8085 Microprocessor Architecture and Pin diagram, Operations, Memory and I/O operations, Address Bus, Data Bus, Control Buses, Demultiplexing of Buses, Generation Of Control Signals, Introduction - Instruction Cycle, Machine Cycles, T-States.	05

3.	**Instruction Set And Programming Of 8085** Classification of Instructions, Addressing Modes, 8085 Instruction Set, Instruction And Data Formats **Basic 8085 Programming:** Assembly Language Programming Basics **Intermediate 8085 Programming I:** The Programs ,Writing 8085 assembly language programs with decision, making and looping using data transfer, arithmetic, logical and branch instructions **Intermediate 8085 Programming II :** Stack & Subroutines, Developing Counters and Time Delay Routines, Code Conversion, BCD Arithmetic and 16-Bit Data operations	15
4.	**Peripheral Interfacing and Interrupt Handling with 8085:** Interfacing Concepts, Interfacing of Memory, Interfacing Of I/O Devices, Programmable Peripheral Interface 8255A Interrupts In 8085, Programmable Interrupt Controller 8259A, Introduction of Timer 8155 IC, USATR 8251 IC	08
5.	**8086 Microprocessor:** 8086 logical block diagram and segments, Instruction set and programming of 8086 , Minimum and Maximum mode	05
6.	**Advanced Microprocessors:** 80286: Architecture, Registers (Real/Protected mode), Privilege levels, descriptor cache, Memory access in GDT and LDT, multitasking, addressing modes, flag register 80386: Architecture, Register organization, Memory access in protected mode, Paging 80486 : Only the technical features Pentium : Architecture and its versions	06
7.	**Microprocessor Case Study:** SUN SPARC, Recent Trends In Microprocessors	03

Suggested Specification table with Marks (Theory): (For B.Tech only)

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
05	20	30	05	-	-

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

Sr No	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1	Microprocessor Architecture, Programming, and Applications with the 8085	Ramesh S. Gaonkar			Penram International.
2	8086 Programming and Advance Processor Architecture,	Savaliya M. T			WileyIndia
3	Microprocessor & Interfacing	Douglas Hall			TMH
4	The 8088 and 8086 Microprocessors	Triebel & Singh,			Pearson Education

Course Outcomes:

Sr. No.	CO statements	Marks % weightage
CO-1	Identify and explain the basic structure and functional units 8085,8086 and advanced processors.	30
CO-2	Develop 8085 assembly language programs and identify the role and working of various functional units of a computer for executing instructions.	30
CO-3	Design circuits for interfacing memory and I/O with 8085 processor	15
CO-4	To apply the 8086 assembly language programming to develop small real life application	20
CO-5	Discuss various trends of microprocessors	5

List of Open Source Software:

1. www.sim8085.com
2. Logisim Simulator

3. https://simulator.io/board
4. https://www.circuitlab.com/

For Lab Sessions:

List of Experiments:

Sr. No	Practical
1.	Introduction to GNU8085 Simulator
2.	Write an 8085 program to exchange the data of two registers and the contents of memory location C020H and C030H.
3.	Write an 8085 program to add and subtract the contents of memory location C000H and C001H and place the result in memory location C002H.
4.	Write an 8085 program to find 1's complement and 2's complement of a given number.
5.	Write an 8085 program to add, subtract two 16-bit numbers stored at C000 and C002. Store result from C005 onwards.
6.	Write an 8085 program to find a greater number between two numbers. Assume numbers are in memory and result stored in memory
7.	Write an 8085 program to find even or odd numbers in a given 2 numbers. Assume numbers are stored in C001 and C002.If numbers are Odd store in C003 and C005. If numbers are even stored in C004 and C006.
8.	Consider an array of 16 data bytes stored at memory locations starting from C500H. Write an 8085 program to copy these data bytes 1. In the same order but starting from memory location C507H. 2. In the reverse order but starting from memory location C500H.
9.	Consider a block of 10 data bytes present in the memory. Write an 8085 program to find out the negative numbers from the block.
10.	**Assembly Language Programming for Studying Various Instructions of 8086.**
11.	Write X86 program to multiply two 16-bit numbers
12.	Write X86 program to perform the conversion from BCD to binary
13.	Write X86 program to count number of positive and negative numbers from the array
14.	Write an X86 program to perform multiplication of two 8-bit hexadecimal numbers. Use successive addition and add and shift methods. (use of 64-bit registers is expected)
15.	Write an X86 program to find the cube of a number.
16.	Write an X86 program to find the factorial of a given number using recursive procedure

17.	Write an X86 program to given string is palindrome or not
18.	Write an X86 program to sort a given set of 16bit unsigned integers into ascending order

Major Equipment Needed:

- 8085 Microprocessor Kit, 8085 and 8086 simulator.