GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: VI

Mechatronics Engineering

Subject Name: **Micro Processors and Micro Controllers**

Sr. No	Course Content	Total Hrs.
1.	**Overview:** From mainframe to microcomputers, from high level to machine languages.	1
2.	**Microprocessor Architecture and Microcomputer Systems:** Microprocessor, Memory, I/Os and Bus Architecture, The 8085 microprocessor architecture, buses, registers and flags.	2
3.	**Programming in 8085:** Introduction to the 8085 instruction set, overview, opcode and operand; one-two-and three byte instructions, loops, indexing and memory reference instructions.	5
4.	**Memory and I/O interfacing:** Memory interfacing, interfacing the 8155, Memory segment, Instruction and machine cycle, T-states and timings, I/O interfacing concepts, Interfacing output displays, Interfacing input Devices, Memory mapped I/O.	10
5.	**Advanced Instructions and Programming:** Counters and Time Delays, Generating pulse waveforms: Stack Subroutine; Restart, Conditional Call and Return Instructions, Advanced subroutine concepts, Code conversion, BCD arithmetic and 16-bit data operations.	10
6.	**Interrupt of 8085:** Polling and Interrupt method, Vectored and Non vectored interrupt, Interrupt priority	4
7.	**The 8051 Microcontroller:** Microcontrollers and Embedded processors, Overview of the 8051 family	2
8.	**8051 Assembly language programming:** Inside the 8051, Introduction, Assembling and running program, the program counter and ROM space, Data types and Directives, Flag bits and PSW register, register banks and stack; Jump, Loop and Call instructions, I/O port programming, Addressing Modes, Arithmetic instructions, Logic Instructions, Single-Bit instructions and Programs.	10
9.	**Advanced 8051 programming and Math Calculations:** Fixed point numbers, addition of two 16-bit numbers, unsigned 32-bit	2

	addition, subtraction of two 16-bit numbers, conversion of 8-bit signed number into a 16-bit signed number, 16-bit signed addition, binary to BCD conversion, square root calculations, Integration, Differentiation, Floating point Arithmetic.	
10.	**8051 Timer /Counter:** 8/16 bit Timer, Timer modes, Timer control register, Programming based on timer	3
11.	**8051 Interrupt :** Peripheral interrupt, External interrupt, Interrupt priority, Program based on Interrupt	3

Text Books:

1. R.S.Gaonkar:
   Microprocessor Architecture Programming and Applications with the 8085
   Penram International
2. Kenneth J. Ayala
   The 8051 Microcontroller Architecture, Programming and Applications
3. Mazidi
   The 8051 Microcontroller and Embedded Systems
   Pearson Education

References Books:

1. B. Ram
   Fundamentals of Microprocessors and Microcomputers
   Dhanpat Rai & Sons
2. Ajay Deshmukh
   Microcontrollers, Theory and applications
   McGraw Hill Education
3. Krishna Kant
   Microprocessors and Microcontrollers: Architecture, Programming and System design
   Prentice Hall of India

List of experiments:

1. Introduction to 8085 simulator and 8085 trainer kit.
2. Simulate programs based on data transfer in 8085
3. Simulate programs based on Arithmetic operation in 8085
4. Simulate the program based on logical operation in 8085
5. Simulate the program based on Advance operation in 8085
6. Design digital clock
7. Program based on 8085 interrupt
8. Introduction to 8051 simulator and simulate program based on data transfer
9. Simulate programs based on Arithmetic operation in 8051
10. Simulate the program based on logical operation in 8051
11. Simulate program based on timer in 8051
12. Simulate program based on Interrupt in 8051