



**M. C. E. Society's**

**Abeda Inamdar Senior College**

Of Arts, Science and Commerce, Camp, Pune-1

(Autonomous) Affiliated to Savitribai Phule Pune University

NAAC accredited 'A' Grade

## **B.C.A. (Science) (Minor) as per NEP**

**(CBCS – Autonomy 21 Pattern)**

<b>Course Offered as</b>	Minor (Theory)
<b>Course/ Paper Title</b>	8051 Microcontroller Programming
<b>Course Code</b>	<b>23SBCA41MNB</b>
<b>Semester</b>	III
<b>No. of Credits</b>	2
<b>No of Hours</b>	30

### **Aims & Objectives of the Course:**

<b>Sr. No.</b>	<b>Objectives</b>
1	To study the basics of 8051 microcontroller
2	To understand the internal architecture of 8051 Microcontrollers.
3	To understand and acquire knowledge in programming 8051 Microcontroller using assembly and Embedded C
4	To study the interfacing techniques of 8051 microcontroller

### **Expected Course Specific Learning Outcome**

<b>Sr. No.</b>	<b>Learning Outcome</b>
1.	Understands basics and architecture of 8051 Microcontroller
2.	Write 8051 Assembly level programs using 8051 instructions Set and C
3.	Interface simple switches, simple LEDs, LCD , DC motor and Stepper Motor to 8051 using 8051 I/O ports.
4.	Design 8051 Microcontroller based applications.
5.	The students can design mini project based on 8051 microcontrollers using Assembly and/or C language.

## Syllabus

Unit No	Title with Contents	No. of Lectures
<b>Unit I</b>	<b>The 8051 Architecture</b>	<b>10</b>
	<ol style="list-style-type: none"> <li>1. Introduction to the concepts of microprocessors and microcontrollers</li> <li>2. Architecture of 8051 microcontroller</li> <li>3. Features of 8051 microcontroller</li> <li>4. Functional Pin out diagram and description of pins</li> <li>5. Special function registers (SFRs)</li> <li>6. Memory Organization</li> <li>7. Interrupts</li> </ol>	
<b>Unit II</b>	<b>8051 Instruction Set and Programming</b>	<b>16</b>
	<ol style="list-style-type: none"> <li>1. <b>Classification of Instruction Set:</b> Data transfer group, Arithmetic group, Logical group, Branching group, Bit Manipulation Group.</li> <li>2. <b>Addressing modes</b> - Immediate, register, direct, register indirect and indexed addressing modes</li> <li>3. Features of machine language, assembly language, middle-level and high-level languages.</li> <li>4. <b>Programs using Assembly Language</b> Arithmetic Operations, Sum of n-numbers, Block transfer, Finding smallest and largest number from a set of numbers. Assembly language programming for interfacing LED</li> <li>5. <b>Embedded C and Programming.</b></li> </ol>	
<b>Unit III</b>	<b>Interfacing the 8051 with Peripherals</b>	<b>10</b>
	<ol style="list-style-type: none"> <li>1) Interfacing of LEDs</li> <li>2) Interfacing of 7-Segment LED Display</li> <li>3) Interfacing of Switches</li> <li>4) Interfacing of 16x2 LCD Display</li> <li>5) Interfacing of DC Motor</li> </ol>	

	6) Interfacing of Stepper motor 7) Interfacing of Servo motor 8) Interfacing of different sensors 9) Interfacing ADC and DAC	
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**References:**

- 1) Muhammad Ali Mazidi and Janice Gillespie Mazidi and Rollin D. McKinlay , The 8051 Microcontroller and Embedded Systems – using assembly and C, Pearson.
- 2) Kenneth J. Ayala, The 8051 Microcontroller, 3rd Edition, Delmar Cengage Learning
- 3) Manish K Patel ,The 8051 Microcontroller Based Embedded Systems , McGraw Hill
- 4) Raj Kamal ,Microcontrollers: Architecture, Programming, Interfacing and System Design, Pearson Education.
- 5) Rao, Dr. K Uma, The 8051 Microcontrollers: Architecture, Programming and Applications, Pearson Education India, New Delhi