GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN ELECTRONICS & COMMUNICATION ENGINEERING

SEMESTER: V

Subject Name: **: Microcontroller and Embedded Systems**

Sr. No.	Course Content
1.	**Evolution of Microcontrollers:** a. Digital System Organisation b. Interfacing other Logic Families c. Microcontroller Architectures d. Data Transfer Schemes e. Microcontroller Based Systems f. Packaging Information g. Microcontroller Families h. The Preceders
2.	**Introduction to Microcontroller Families:** a. 8051 Family architecture, features and capabilities b. Reset & Clock circuit c. I/O Ports & Characteristics d. Counter & Timers e. Seial Communication f. Interrupt Handling g. External Memory interfacing h. High Speed Derivatives of 8051 family i. AT89C52
3.	**Introduction to Assembly Language Programming:(only 8051)** a. Software Development b. Assembly Language Programming c. Assembler Directives d. Instruction Set e. Programming Examples f. C-Cross Compiler
4.	**Advanced Programming Techniques(Conceptual limited up to Flow charts)** a. Code Converters b. Array Handling & Testing Process Maturity Models c. Counters And Delays d. Sample programs for looping, counting and indexing
5.	**External Peripheral Devices:** a. Sensors(Temperature, Level, Tilt, RH, Pressure, Hall effect, PIR, Strainguage)

	b. Input Devices o DIP Switch o Thumbwheel switch o Tactile switch o ADC0804 o DAC 0808 c. Output Devices (Relay ,Solenoid valve,7 segment Display, LCD d. Block diagram for analog interfacing Design (Sensor to Actuator) e. Interfacing of RTC12887
6.	**Advance RISC Machines:** a. Introduction to ARM b. ARM architecture c. ARM based MCUs d. ARM/THUMB programming model e. PIC controller: introduction and features of PIC18F4431 f. ADμC-842

The sample experiments to be performed included, but are not limited to the following:

1. Building oscillator circuits for 8051.
2. Building reset circuits for 8051.
3. Internal Architecture of 8051.
4. Interrupt mechanism of 8051.
5. Connecting external memory circuits.
6. Assembly programs for various operations .
7. Interfacing LED display.
8. Interfacing to sensor.
9. Interfacing hex keypad.
10. Interfacing LCD display.
11. Interfacing of relay.
12. Interfacing of stepper motor.
13. Interfacing of 8255, 8279 & 8251.
14. Practice of Downloading Program For Execution
15. Program for complex Boolean application.

Reference Books:

1. 8051 Microcontrollers MCS Family and Its variants - Satish Shah , Oxford University Press.
2. Microcontrollers: Architecture, Programming, Interfacing and System Design, Raj Kamal, Pearson.
3. The 8051 Microcontroller and Embedded Systems Using Assembly and C -Mazidi, Mazidi and McKinlay, Pearson.
4. The 8051 Micro controller Architecture, Programming and Applications, K. J. Ayala, Penram.
5. 8051 Microcontroller & Embedded System Sampath K. Venkatesh Katson.