

# GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Semester: 1

Instrumentation and Control Engineering  
(Applied Instrumentation)

Subject Name: Advance Microcontroller

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Sr.No	Course content
1.	<b>Microprocessor and Microcontroller fundamentals</b> Microcontroller architecture- PIC 18F family
2.	<b>PIC 18F programming model and its instruction set</b> Program format and syntax Programming and problem solving
3.	<b>Introduction to instruction</b> Data copy, move Arithmetic and branch instruction Logic, bit manipulation Multiply/Divide operations
4.	<b>Stack and sub routines</b> Stack Subroutines Macros and Software stack
5.	<b>Input/output ports and interfacing</b> Output peripherals Seven segment display LCD Matrix keyboard
6.	<b>Interrupts</b> Basic concepts in Interrupt PIC 18 interrupts
7.	<b>Timers</b> Basic concepts in Timers and counters PIC 18 timers CCP (Capture, Compare and PWM) modules
8.	<b>Data Converters</b> Data converters : Basic concepts AD converter module in PIC 18F452

### **List of Experiments :**

1. Data transfer instructions programs for PIC 18F452 using MPLAB IDE
2. Generating waveforms, arithmetic instructions related programs using MPLAB IDE
3. Programs related to Data string Search and string operations
4. Programs to calculate average temperature and adding a group of data
5. Programs to multiply 16 bit numbers and division to two 8 bit Unsigned numbers
6. Interfacing a matrix keyboard using PIC 18F452
7. Interfacing a LCD using PIC 18F452
8. Interfacing a Seven segment LED's using PIC 18F452
9. Implementation of Interrupts process in PIC 18F452
10. Designing a 12 hour clock using PIC 18F452

### **Reference Books:**

- 1) Fundamentals of Microcontrollers and applications in Embedded Systems  
- Ramesh Gaonkar, Penram Publications
- 2) PIC Microcontrollers and Embedded Systems  
- Muhammad Mazaidi, Pearson Publications
- 3) [www.microchip.com](http://www.microchip.com)