

GUJARAT TECHNOLOGICAL UNIVERSITY
M.E. SEMESTER-II
MECHATRONICS ENGINEERING

Subject Name: **Advance Microcontrollers and Logic Controllers**
Subject Code: **1724702**

Sr. No.	TOPIC	No. of Hours
1	Introduction to 16 bit microcontrollers: MSP430 series microcontrollers , Timer and various modes of operation: up mode, down mode, continuous mode, Pulse width modulated wave generation, Capture mode of timers, Watch dog timers, Real Time Counters	7
2	Comparators : Operation and applications	2
3	Basics of Analog to Digital Conversion: Successive Approximation Register architecture basics and its special function registers for operation in microcontrollers	5
4	Digital to analog converters in microcontrollers	2
5	Serial Interface Protocols: Synchronous Peripheral Interface (SPI) signals and modes of serial communications with SPI interface, Universal Asynchronous Receiver Transmitter (UART) interface, Basics of Inter-Integrated Circuit (I ² C) Bus, Operations of serial interface protocols handled in microcontrollers through special function registers	7
6	Low power mode of operations in advance microcontrollers	2
7	PLC Basics: Introduction to PLC based systems, PLC hardware, PLC architecture, Input/Output modules, scan cycle and scan time	4
8	Basic PLC programming: Programming On/Off Inputs To Produce On-Off Outputs, Relation Of Digital Gate, Logic to Contact/Coil Logic, Creating Ladder Diagrams From Process Control, Descriptions	4
9	PLC Functions: Timer functions, Counter functions, Analog Input/Output functions, number comparison functions, Arithmetic functions, Jump function, Data move function, close loop control using PLC, PID control	15
10	Programming of PLC using Mnemonic codes	4

Reference Books:

1. MSP430 Microcontroller Basics by John H. Davies, Newness Publishers
2. W. Bolton , “Programmable Logic Controllers”, 4th Edition by, Newnes/ ELSEVIER Publication.
3. Jhon W Webb, Ronald A Reis, “Programmable Logic Controllers, Principles and Appliaiotns” Prentice Hall of India Pvt. Ltd.