

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. Embedded Systems (Branch Code - 54)

Year – I (Semester – II) (W.E.F. January 2014)

Subject Name: Mixed Signal Controller (725401)

Course Content:

Sr. No.	Course Content	Hours
1	MSP430 series Microcontroller: Architecture of MSP430 Microcontrollers: Central Processing Unit and Registers, Basic Clock Module and operation: Digital Controlled Oscillator and Registers Digital Input-Output: Input, Output Registers, Function Select Register, Port Interrupts, Pull Up/Down Registers Timers: Timer Block diagram and Operation, Timer Modes, Output Unit, Timer Interrupts, Low Power Down Modes, Watchdog Timer and operation	18
2	Mixed Signal Systems: Analog to Digital Convertors: General Issues for Analog to Digital Convertors regarding Resolution, Precision, Accuracy, Signal to Noise Ratio, Successive Approximation Register(SAR) ADC Architectural Block diagram, operation of ADC10 and ADC 12 in MSP430 Microcontrollers, Timing and Triggering options of ADC, Low power and Interrupt operation with ADC, Conversion modes for Single and Repeated conversion, Special Function Registers for ADC operation	22
3	Digital to Analog Convertors: Basics of Digital to Analog Convertor (DAC12) in MSP430 Microcontroller, Architectural Block Diagram and Operation of DAC12, Data format, port selection, Timer operation in association with DAC12, Special Function Registers for DAC operation	06
	Comparator: Architecture and Operation of Comparator, Special Function Registers, Applications of Comparator Hardware Multiplier: Hardware Multiplier Operation, Registers	08
4	Direct Memory Access Controller (DMA): Direct Memory Access (DMA) Controller Block diagram and operation, DMA Transfer Modes, DMA Trigger Operation, Using ADC12 and DAC12 in association with DMA	10
5	Embedded Signal Processing : Basics of convolution, Implementation of FIR Filter using MSP430 Microcontroller with the help of ADC12, DMA Controller and DAC12	08
	Total	72

Reference Book:

1. MSP430 Microcontrollers Basics, John H Devis, 1st Edition, Newnes Publishers
2. MSP430 Microcontrollers in Embedded System Projects, C P Ravikumar, 1st Edition, Elite Publishing House
3. Analog and Digital Circuits for Electronic Control System Applications: Using the TI MSP430 Microcontroller, Jerry Luecke, 1st Edition, Elsevier Science