



National Institute of Technology Meghalaya
An Institute of National Importance

CURRICULUM

Programme	Master of Technology in VLSI and Embedded Systems	Year of Regulation	2018-19
Department	Electronics and Communication Engineering	Semester	I

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
EC 515	Mixed Signal Design	3	0	0	3	25	25	50	100

Course Objectives	To know about the practical implementation of Mixed Signal Design Circuits		Course Outcomes	CO1	Able to understand Mixed Signal Design Circuits
	To know about Analog to Digital Convertors CMOS based design			CO2	Able to learn Analog to Digital Convertors CMOS based design
	To know about Digital to Analog Convertors CMOS based design			CO3	Able to learn Digital to Analog Convertors CMOS based design
	To know about Phase lock loop and Delay lock loop			CO4	Able to acquire knowledge on Phase lock loop and Delay lock loop

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	3	3	0	1	0	0	0	0	2	0	0	0	3	0	3
2	CO2	3	3	0	1	0	0	0	0	2	0	0	0	2	0	2
3	CO3	2	3	3	1	2	0	0	0	0	0	0	0	2	3	2
4	CO4	2	2	3	0	2	2	3	0	2	0	0	1	2	3	2

SYLLABUS

No.	Content	Hours	COs
I	Analog and Discrete-Time Signal: Analog and discrete-time signal processing, introduction to sampling theory, Analog continuous-time filters: passive and active filters, Basics of analog discrete-time filters and Z-transform, Switched-capacitor filters.	3	CO1
II	Non-linear & Dynamic Analog Circuits: Basic CMOS Comparator Design, Adaptive Biasing, Analog Multipliers.	7	CO1
III	Basics of Analog to Digital Converters (ADC): Basics of data converters, Successive approximation ADCs, Dual slope ADCs, High-speed ADCs (flash ADC, pipeline ADC and related architectures), High-resolution ADCs (delta-sigma converters)	10	CO2
IV	Basics of Digital to Analog Converters (DAC): DAC specifications, DAC Architectures, Mixed-signal layout issues.	8	CO3
V	Phase Locked Loops: Voltage-mode signaling and data transmission, Current-mode signaling and data transmission, Introduction to frequency synthesizers and synchronization, Basics of PLL, AnalogPLL, Digital PLL, Delay locked loops (DLL)	8	CO4
Total Hours		36	

Essential Readings

1. Baker, Li, Boyce, "CMOS Circuits Design, Layout and Simulation", TMH.
2. Allen Halburg, "Analog Integrated Circuits", Oxford
3. David A. Johns, Ken Martin, John , "Analog Integrated Circuit Design" Wiley & Sons.

Supplementary Readings

1. . B.Razavi, "Design of AnalogCMOS Circuits" ,TMH
2. R. Gregorian, Gabor. C. Temes , "Analog MOS ICs for Signal Processing " , John Wiley & Sons