



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			II			
Course Code	Course Name									Credit Structure				Marks Distribution			
										L	T	P	C	INT	MID	END	Total
EC 520	RFIC DESIGN									3	0	0	3	25	25	50	100
Course Objectives	To learn about the RF circuit (active and passive) design basics									Course Outcomes	CO1	Able to learn about the RF circuit (active and passive) design basics					
	To learn about the RF Frontend design										CO2	Able to analyze about the RF Frontend design					
	To learn about the RF Receiver design										CO3	Able to design RF Receiver					
	To learn about the RF Transmitter design										CO4	Able to design RF Transmitter					
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	2	3	2	1	0	3	0	0	2	0	0	0	3	0	3	
2	CO2	3	2	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	0	
4	CO4	2	2	3	0	2	2	3	0	2	0	0	1	0	3	2	
SYLLABUS																	
No.	Content													Hours	COs		
I	Review Of RF Basics Review of RF Theory: RF range, skin effect, behavior of various passive components like R, L, C, at high RF, their equivalent circuits at high RF. Transmission line theory, reflection coefficient, Smith chart calculation, impedance matching, S-parameter.													4	CO1		
II	Introduction to RF Design Basic concepts in RF design: RF design, nonlinearity, harmonics, gain compression, desensitization, cross modulation, inter modulation distortion (IMD), input intercept point (IIP3 & IIP2), inter symbol interference. Noise, types of noise, noise analysis of active devices.													6			
III	Basics of RF Frontend Antenna design: Microstrip and patch antenna for 915 MHz and 2.4 GHz. RF Switch, Filters- type and design													9	CO2		
IV	Receiver Design TRF receivers, heterodyne receivers, Homodyne receivers, their comparison, type RF receiver architecture and its design. Design concepts-1: Low noise amplifiers, various topologies, comparison and design. Mixers, various topologies, comparison and design, Oscillators (emphasis to PLL and VCO) design.													9	CO3		
V	Transmitter Design Design concepts-2: Power Amplifiers, various topologies, comparison and design. Difference between Linear and Non-Linear Power Amplifiers.													8	CO4		
Total Hours													36				
Essential Readings																	
1. R. Ludwig and P. Bretchekeo, RF circuit design, PHI, 1st Edition, 2000.																	
2. B. Razavi, RF Microelectronics, PHI, Edition 1, 1998.																	
3. S. C. Cripps, RF Power Amplifiers for Wireless Communications , Artech House, Inc. Publication, 1st Edition, 1999																	
Supplementary Readings																	
1. T. H. Lee, The design of CMOS radio frequency integrated circuits, Cambridge University Press,1st Edition, 1998.																	
2. L.E Larson, RF and Microwave circuit design for wireless communication, Artech House Inc. Publication, 1st Edition, 1997.																	