Birla Institute of Technology & Science, Pilani
Hyderabad Campus

ACADEMIC-GRADUATE STUDIES AND RESEARCH DIVISION
FIRST SEMESTER 2022-2023
Course Handout Part II

Date: 28-07-2023

In addition to part-I (General Handout for all courses appended to the timetable) this portion gives further specific details regarding the course.

Course No. : EEE G510
Course Title : RF Microelectronics
Instructor-in-Charge : Dr. Sourav Nandi

1. Course Description:
Introduction; application of RF electronics in modern systems; basic concepts in RF circuit design, active RF components: various RF diodes and transistors and their circuit models, matching and biasing networks, RF amplifier design: low power, low noise and broadband amplifiers, RF oscillator design; negative resistance oscillator; dielectric resonator oscillators, phase noise. RF Mixers: Balanced mixers; low noise mixers; noise in RF circuits, microwave transmitters and receivers.

2. Scope and objective of the course:
Objective of the course is to provide basic understanding of and skills to analyze and design CMOS RF integrated circuits. It will address all the relevant aspects of implementing various RF circuits in CMOS technology, which are used in communication applications including LNA, mixer, PLL, Power amplifier, oscillator and frequency synthesizers.

3. Text Book: Behzad Razavi, RF Microelectronics, Pearson India Education Services, 2nd edition, 2012.

4. Reference Books: Thomas H. Lee, The Design of CMOS Radio-Frequency Integrated Circuits, Cambridge University Press, 2nd edition, 2004.

5.Course Plan:

Lecture No.	Learning objectives	Topics to be covered	Chapter in the Text Book
1	Introduction to the course	Course handout discussion	
2-8	In-depth understanding of all the generic issues pertaining to the performance of RF circuits	Basic Concepts in RF Design	Chapter-2 (T.B)
9-15	Understanding of various RF transceiver architectures and their relative benefits.	Transceiver Architectures	Chapter-4 (T.B)
16-24	Understanding of various LNA topologies and their relative performance	Low-Noise Amplifiers	Chapter-5 (T.B)

25-30	Understanding of various mixer topologies and their relative performances	Mixers	Chapter-6 (T.B)
31-34	Basic understanding of CMOS RF oscillators	Oscillators	Chapter-8 (T.B)
35-38	Basic understanding of PLLs in CMOS	Phase-Locked Loops	Chapter-9 (T.B)
39- 40	Basic understanding of CMOS freq. synthesizers	Freq. Synthesizers	Chapter-10 (T.B)
41-42	Basic understanding of CMOS RF power amplifiers	RF power amplifiers	Chapter-12 (T.B)

6.Evaluation Scheme:

Component	Duration	Weightage (%)	Marks	Date & Time	Nature of Component
Literature Survey, Design, Lab Presentations	-	30%	60		Open Book
Assignment		10%	20		Open Book
Quizzes	-	10%	20	To be announced in the class	Closed Book
Midterm test	90 mins	20%	40	10/10 11.30 - 1.00PM	Closed Book
Comprehensive exam	180 mins	30%	60	09/12 FN	Closed Book

7.Chamber Consultation Hour: To be announced in the class.

Notices: Notices concerning this course will be on CMS.

8.Make-up Policy: Make-up will be given only to genuine cases. Prior applications must be sent for seeking the same. For quizzes and assignments, make-up will not be permitted.

9.Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Dr. Sourav Nandi
INSTRUCTOR-IN-CHARGE