Second Semester 2019-20
Course handout Part II Date: 12-12-2019

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

Course No. : EEE G510
Course Title : RF Microelectronics
Instructor-in-charge : Chandra Shekhar
Instructor : Pankaj Arora

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:

Module	Lecture No.	Reference	Learning Outcome
1. Basic Concepts in RF Design	1-8	Chapter-2 (T.B)	In-depth understanding of all the generic issues pertaining to the performance of RF circuits
2. Low-Noise Amplifiers	9-17	Chapter-5 (T.B)	Understanding of various LNA topologies and their relative performance
3. Mixers	18-23	Chapter-6 (T.B)	Understanding of various mixer topologies and their relative performances
4. Transceiver Architectures	24-30	Chapter-4 (T.B)	Understanding of various RF transceiver architectures and their relative benefits.
5. Oscillators	31-34	Chapter-8 (T.B)	Basic understanding of CMOS RF oscillators
6. Phase-Locked Lops	35-38	Chapter-9 (T.B)	Basic understanding of PLLs in CMOS
8. Freq. Synthesizers	39- 40	Chapter-10 (T.B)	Basic understanding of CMOS freq. synthesizers
9. RF power amplifiers	41-42	Chapter-12 (T.B)	Basic understanding of CMOS RF power amplifiers

6. Project Topics: Specific topics will be selected and announced in the class for assignments/ project.

/seminars

7. Evaluation Scheme:

Component	Duration	Marks/Weightage Total Marks = 100	Date & Time	Remarks
Assignments/Projects/Seminars	-	20/20%	-	Open Book
Quizzes	-	20/20%		Open Book
Midterm test	90 mins	20/20%	2/3 3.30 - 5.00 PM	Closed Book
Comprehensive exam	180 mins	40/40%	02/05 AN	Closed Book and Open Book

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

9. Notices: Notices, if any, will be displayed on the EEE Notice Board// NALANDA (online portal).

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

11.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.

Instructor-in-charge
EEE G510