

## AICTE Sponsored Short Term Course

on

## Phase-Locked Loops

17<sup>th</sup> – 22<sup>th</sup> Dec., 2018

### Coordinators

**Dr. Saurabh Saxena**

**Dr. S. Aniruddhan**

**Dr. Nagendra Krishnapura**



### Organized by

Integrated Circuits & Systems Group, IITM

### Venue

Department of Electrical Engineering  
Indian Institute of Technology Madras  
Chennai - 600 036  
[www.iitm.ac.in](http://www.iitm.ac.in)

## COURSE OBJECTIVES

This short term course aims to provide the participants with an understanding of phase-locked loops (PLLs) and their basic operating principles. PLLs will be analyzed using widely-used linear models to relate system level parameters to component values. The emphasis is on intuitive understanding of the operation and key results. Exemplary transistor level designs of key building blocks will be discussed.

The participants will be exposed to state-of-the-art frequency synthesis techniques for narrow- and broad-band communication systems. The participants will be equipped with skills to analyze, debug, and evaluate a PLL design analytically in a behavioral simulator and at the transistor level in a circuit simulator. They will be prepared to carry out initial designs of PLLs used for high frequency clock generation and RF frequency synthesis.

## PROPOSED TOPICS TO BE COVERED

- 1) System-level requirements for PLLs
- 2) Basic phase/frequency and loop gain concepts in Type-I PLL
- 3) Frequency acquisition in PLLs
- 4) Phase/frequency error detectors
- 5) Charge-pump based type-II integer-N PLLs
- 6) Noise analysis in charge-pump PLLs
- 7) Design of PLL building blocks: PFD, charge-pump, ring oscillators, supply regulated oscillators, active/passive loop filters
- 8) Digital PLLs

## REGISTRATION FEE

There is no course fee for the participants from AICTE approved engineering colleges.

## ELIGIBILITY

Preference will be given to faculty members teaching undergraduate and graduate courses in analog and mixed signal circuit design.

## IMPORTANT DATES

Course dates: **17/12/2018 – 22/12/2018**

Last date for application: **31-08-2018**

Intimation of selection (by email): **10-09-2018**

Applicant confirmation (by email): **20-09-2018**

## Online Application

<https://goo.gl/forms/rfvJu68Q4lkgWLta2>

## Integrated Circuits & Systems Group

*(Dept. of Electrical Engineering, IIT Madras)*

Our faculty members and students are involved in research in the areas of analog, mixed signal, and RF design, analysis and simulation of noise in circuits, VLSI DSP architectures, and reconfigurable computing.

Faculty actively engaged in research teaches our graduate and undergraduate courses. The core courses and electives are designed to give students a firm grounding in basics and advanced skills in the chosen area of specialization. We now record our lectures in class. Our course webpages and recorded lectures can be accessed at <http://www.ee.iitm.ac.in/ics/>.