



INTEGRATED CIRCUITS, MOSFETS, OP-AMPS AND THEIR APPLICATIONS

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IISc Bangalore

TYPE OF COURSE : Rerun | Elective | UG/PG

COURSE DURATION : 12 weeks (24 Jan' 22 - 15 Apr' 22)

EXAM DATE : 23 Apr 2022

PRE-REQUISITES : B.Tech./B.E./M.Sc. and M.Tech./M.E.

INTENDED AUDIENCE : Engineering Students, Faculty from Engineering Colleges

COURSE OUTLINE :

This course is a design-oriented course aimed at understanding fabrication, parameters, and specifications of integrated circuits, MOSFETs, Op-Amps as well as their applications in the Analog domain. Below are some of the course outcomes:

- To understand and analyze the Op-Amps.
- The ability to understand the IC Technology and equipment used in fabrication.
- To understand feedback techniques and types of Noise.
- Ability to design amplifiers using Op-Amps.
- Ability to analyze and design filters using Op-Amps,
- To develop the skill to build and troubleshoot Analog circuits

ABOUT INSTRUCTOR :

Prof. Hardik J. Pandya is an assistant professor in the Department of Electronic Systems Engineering, Division of Electrical Sciences, IISc Bangalore where he is developing Advanced Microsystems and Biomedical Devices Facility for Clinical Research and Biomedical and Electronic (10-6-10-9) Engineering Systems Laboratory to carry out cutting-edge research on novel devices to solve unmet problems in biology and medicine. He is recipient of prestigious Early Career Research Award from Science and Engineering Research Board, Government of India as well as a start-up grant of 228 Lacs from IISc. He has taught Design for Analog Circuits, Analog Integrated Circuits, VLSI technology, and Semiconductor Devices to undergraduate and graduate students from Electronic Engineering, Instrumentation Engineering, and Applied Physics. He seeks to understand and exploit novel ways of fabricating microengineering devices using glass, silicon, polymers and integrate with unusual classes of micro/nanomaterials. His research interests include integrating biology/medicine with micro and nanotechnology to develop innovative tools to solve unmet clinical problems.

COURSE PLAN :

Week 1: Introduction to Integrated Circuit Technology

Week 2: Fabrication processes for Integrated Circuits

Week 3: Understanding Op-Amps

Week 4: CMRR of an Op-Amp and Offset voltages and currents

Week 5: SFETs Fabrication and Applications

Week 6: Frequency Response and Feedback techniques for Integrated Circuits

Week 7: Comparators, Instrumentation Amplifiers, Filters

Week 8: Oscillators

Week 9: MOSFETs Current Mirrors

Week 10: Noise, Op-Amp Circuits Analog to Digital Converter (ADC)

Week 11: Digital to Analog Converter (DAC) using Op-Amps

Week 12: Understanding the Datasheet of Op-Amps