



OP-AMP PRACTICAL APPLICATIONS: DESIGN, SIMULATION AND IMPLEMENTATION

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TYPE OF COURSE	: Rerun Elective UG/PG	COURSE DURATION	: 12 weeks (26 Jul'21 - 15 Oct'21)
PRE-REQUISITES	: Op-Amps fundamentals, Basic Electronics and Circuits and Networks	EXAM DATE	: 24 Oct 2021
INTENDED AUDIENCE	: Any Engineering Student/Faculty		

COURSE OUTLINE :

This course is a system design-oriented course aimed to provide exposure on applications of op-amps and its importance in the real world. Since analog circuits play a crucial role in the implementation of an electronic system, this course emphasis on complete system design with initial discussion on circuit design. As part of this course student can build analog systems using analog ICs and study their macro models. Below are some of the course outcomes. (1)To expose the operation of the basic building blocks of analog system. (2)To understand and analyze the Op-Amps. (3)To understand feedback techniques and its advantage. (4)Ability to design amplifiers using Op-Amps. (5)Ability to analyze and design filters using Op-Amps. (6)To develop the skill to build and troubleshoot Analog circuits. (7)To develop the skill to build complete system using analog circuits.

ABOUT INSTRUCTOR :

Prof. Hardik J. Pandya is a core faculty member 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.

COURSE PLAN :

- Week 01** : Understanding the Datasheet of Op-Amps
- Week 02** : Introduction to op-amps and discussion on its characteristics by simulation and experiment
- Week 03** : Understand the basics of Hysteresis and the need of hysteresis in switching circuits
- Week 04** : Op-Amp Circuits Analog-to-Digital Converter (ADC)
- Week 05** : Digital-to-Analog Converter (DAC) using Op-Amps
- Week 06** : To design and build a function generator capable of generating square wave and a triangular wave of a known frequency using simulation and experiment by TI analog system lab kit pro
- Week 07** : To design and build a voltage-controlled oscillator using simulation and TI analog system lab kit pro
- Week 08** : To design and build an automatic volume control using simulation and TI analog system lab kit pro
- Week 09** : To design and build a constant current drive circuit for measuring unknown resistance using simulation and Experiment on bread board
- Week 10** : To design and build a temperature controlled system using op-amps as ON-OFF controller and Proportional controller by simulation and Experiment on bread board
- Week 11** : To design and build a signal conditioning circuit for the thermocouple to compensate for temperature correction
- Week 12** : To design and Implement a speed controller of a DC motor using simulation and experiment