Course content

Topic Name: Design with OPAMP

Relevant Course Name: Linear Integrated Circuits

Relevant Department: Electrical Engg. and; Electronics and Communication Engg.

Relevant Semester: Final year BTech/BE (EE/EC/IN)

IIT Faculty Name: Prof. Hitesh Shirmali (**IIT Mandi)**

Pre- requisites: Opamp, Basic electronics (BJT understanding), control theory, signals and systems

Topic Description and Outline:

Lecture 1 (Opamp overview and oscillators) [2 hours]

- Operational amplifier ICs (741 and TL082): pin diagram and comparison
- Oscillators: basic principle of oscillations, Opamp based RC oscillators: Wien bridge, phase shift and the quadrature oscillators, LC and crystal oscillators

Lecture 2 (Data converters) [2 hours]

- Introduction to data conversion specifications and terminologies
- Digital-to-analog converters (DAC): R-2R, current steering, charge and voltage-scaling DAC
- Analog-to-digital converters (ADC): Flash, SAR and integrating type

Lecture 3 (Passive/active filter design) [2 hours]

- Passive filter understanding: first, second and higher order filter understanding using RLC
- Design of active filter: Sallen and Key filter, Integrator-based biquads
- Filter approximations: Butterwoth and Chebyshev response