

# IN 277 (AUG) 2:1

## Instrumentation Electronics Laboratory

Department of Instrumentation and Applied Physics  
Indian Institute of Science  
Bangalore 560012

August 6, 2024

# Time Slots

## Class Hours

Lectures: Tue/Thu 11:30 to 13:00 (LH-2/IAP)

AND

Laboratory: 3 hours per week (flexible hours)

## Target Audience

- M.Tech. course students of IAP
- Selected research students of IAP

## Instructor

A. Mohanty

Room 005

Department of Instrumentation and Applied Physics

Contact: [amohanty@iisc.ac.in](mailto:amohanty@iisc.ac.in)

## **IN 277 (AUG) 2:1**

### **Instrumentation Electronics Laboratory**

Applications of operational amplifiers, active filters, oscillators, A/D and D/A converters, phase-locked loops, mixers, lock-in amplifiers, switched mode power supplies, speed control of motors using PWM, introduction to microcontrollers and microprocessors. (There will be lectures and laboratory sessions on each of the topics mentioned here.)

- Paul Horowitz and Winfield Hill, *The Art of Electronics*, Cambridge University Press, 2015
- Jacob Millman and Christos C. Halkias, *Integrated Electronics*, McGraw-Hill International Student Edition, 1972
- Robert W. Erickson and Dragan Maksimovic, *Fundamentals of Power Electronics*, Springer, 2001
- R. S. Kaler, *Microprocessors and Microcontrollers*, I. K. International Publishing House, 2014

Electronic Device: A device that allows us to control the flow of electrons.  
What do we gain?

## Analogue Electronics

- Ability to amplify weak signals
- Amplifiers  $\Rightarrow$  oscillators, waveform generators

## Digital Electronics

- Logic, computation, information processing

# Objectives and Structure

## Objectives

- Provide basic training in electronics.
- Enable students to build simple electronic systems.
- Prepare students for other IAP courses such as IN 221 and IN 222.

## Structure

- Lectures and demonstrations
- Laboratory sessions

## Documentation

- Maintain a record of all laboratory work.
- Experiments will begin after a few lecture/demonstration classes.

# Evaluation

- Laboratory: Attendance, completion of experiments
- Theory: Written examinations

- Requires the safety standards of an electronics laboratory
- Proper shoes
- Gloves and safety goggles if required

# Topics for Revision

- Laboratory Equipment
  - Power supply
  - Signal generator
  - Multimeter
  - Oscilloscope
- Circuit Analysis
  - Transient Analysis
  - Phasor Analysis
- Passive Circuit Elements: R, C, L, M
- Diodes
- BJTs and MOSFETs



# Next Class

11:30 AM

08 August 2024, Thursday