

Department of Bioengineering, CMC-Vellore

Transducers and Instrumentation Lectures and Labs Jan.-April 2021

Instructors: Dr Suresh Devasahayam, surdev@cmcvellore.ac.in (Jan-March 12)

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Lab No.	Lectures	Week beginning
1	Introduction to measurement. Transducers. Transfer function, frequency response	Jan. 04
2	Analog signal processing, operational amplifiers. Linear circuits with opamps. Filters.	Jan.11
3	System characterization. Estimating transfer function.	Jan. 18
4	Resistive transducers for displacement, strain, load measurement	Jan. 25
5	Sensors with compensation, feedback for adjustable damping.	Feb. 01
6	Electromagnetic transducers – actuation and sensing. Displacement sensors – inductive and capacitive Piezoelectric transducers	Feb. 08
7	Flow and volume measurement Optical sensors. Distance and depth measurement	Feb. 15
8	Spatial sensors – radiation thermometry, spectrophotometry	Feb. 22
9	Digitization, A/D. Data communication	Mar. 01
10	Inertial motion sensors: Accelerometers, gyroscopes.	Mar 08
11	Gas and chemical sensors. Spectrophotometric sensing.	Mar 15
12	Biopotential electrodes and measurement.	Mar 22
13	Examples of Physiological measurement	Mar 29
14	System design, power supply, digital analysis.	Apr 05
15	Review	Apr 12

Mid-term: 40%

Assignments: 30% (2x15%)

Final Term paper: 30%

Note:

There will be 2 mid-term exams, one in February and one at the end of March. - Feb.16 and March 30.

The students in Vellore at that will take the exam in class – this will be counted as a mid-term. For those not in Vellore at that time, this will be counted as an assignment.

There will be one other assignment common to all students

The final exam will be a term paper to be submitted online.