

**Course: Minor  
Computer Instrumentation**

<b>Semester: II</b>	<b>Credits: 2</b>	<b>Subject Code: BSMINELE22302</b>	<b>Lectures: 30</b>
---------------------	-------------------	------------------------------------	---------------------

**Course Outcomes:**

**Course Outcomes:**

At the end of this course, the learner will be able to:

- CO1- Recall the basic knowledge of semiconductor devices and their working and use of signal conditioning circuits in a system.
- CO2 - Explain the working principle of sensors and transducers and their classification, Identify and apply the knowledge of sensors in smart instrumentation system
- CO3 - Classify different types of ADC and DAC, apply the knowledge of conversion of digital to analog and vice-versa
- CO4- Apply the knowledge above to understand an instrumentation system.

**Unit 1: Basic semiconductor devices and Signal conditioners** **15**

- Introduction to semiconductor: Intrinsic and extrinsic semiconductor P and N-type semiconductor, the study of PN junction diode and its characteristics, LED, Photodiode and optocoupler.
- **Introduction to signal conditioning** - Transistor and its types, concept of amplifier Introduction to MOSFET, Operational amplifier - basic parameters differential and common mode gain, CMRR, the concept of negative feedback, Op-amp as an inverting amplifier, **Applications of the Op-amp as an adder, subtractor, and comparator**

**Unit 2: Introduction to Sensors and Data Converters** **15**

- **Definition of sensors and transducers. Classification of sensors: Active and passive sensors. Working principle and application of -Temperature sensors (LM-35, Thermistor AD590), optical sensor (LDR), Passive Infrared sensors (PIR), Accelerometer sensors, tilt sensors, touch screen sensors (Capacitive type), ultrasonic sensors, Motion Sensors.**
- **Data Converters - Need of DAC and ADC and its parameters, R-2R ladder network DAC, Flash ADC**
- Block diagram of smart instrumentation systems

**Reference Books:**

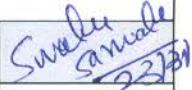
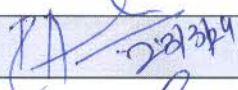
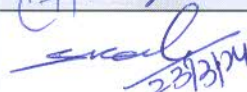
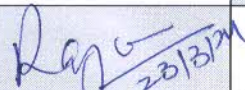
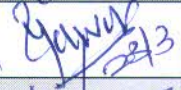
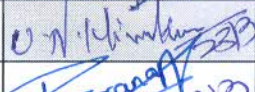
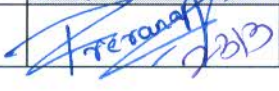
- Prof A.D. Shaligram *Sensors and Transducers*
- Bernard Grob, *Basic Electronics*, McGraw Hill Publication, 8th Revised Edition, 2010
- D. Patranabis *Sensors and Transducers*, PHI publication, 2nd Edition
- Ramakant Gaykwad, *Op Amp and Linear Integrated Circuits*
- V.K. Mehta, *Principles of Electronics*, Chand and Co.



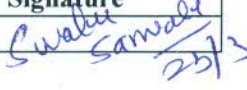
Board Of Studies	Department	Name	Signature
Chairperson (HoD)	B.Sc(Comp. Sci.)	Swatee Sarwate	<i>Swatee Sarwate</i> 22/2/22

**Websites:**

- <http://www.electronicsforu.com/newelectronics/default.asp>
- <https://www.instructables.com/id/Basic-Electronics/>
- <https://www.instructables.com/id/Basic-Electronics/>
- <https://electronicsforu.com/>
- <https://www.howstuffworks.com/>
- <https://www.instructables.com>
- <https://nptel.ac.in/courses/122/106/122106025/>
- <https://nptel.ac.in/courses/117/103/117103063/>

Board of Studies	Name	Signature
Chairperson (HoD)	Swatee Sarwate, Asst. Prof.	 Swatee Sarwate 22/3/24
Faculty	Anitha Menon, Asst. Prof.	 22/3/24
Subject Expert (Outside SPPU)	Dr. Sangeeta Kale, Professor	 22/3/24
Subject Expert (Outside SPPU)	Dr. Rajshree Jain	 22/3/24
VC Nominee (SPPU)	Dr. Pravin Yawale	 22/3
Industry Expert	Dr. Umesh N. Hivarkar	 22/3
Alumni	Ms. Prerna Polekar	 22/3



Board Of Studies	Department	Name	Signature
Chairperson (HoD)	B.Sc(Comp. Sci.)	Swatee Sarwate	 Swatee Sarwate 22/3