

# GUJARAT TECHNOLOGICAL UNIVERSITY

## Instrumentation and Control Engineering

### B. E. SEMESTER: VII

Subject Name: **Instrumentation for Nanotechnology**  
(Department Elective – I)

Subject Code: **171706**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
4	0	2	6	70	30	30	20

Sr. No	Course Content	Total Hrs.
1.	<b>Sensors for Nanotechnology Instruments:</b> Type of Sensors, quartz sensors, ultrasonic sensors, optical sensors, Solid State micro sensors, and sensor working principle, applications, selection criteria and issues related to sensor technology	<b>6</b>
2.	<b>Low level signal conditioning:</b> Issues related to Nano-range signal conditioning, Nanoampere measurement, Nanovolt measurements, amplifier design for Nano signal, and selection of components for signal conditioning, digital signal processing	<b>20</b>
3.	<b>Nanotechnology Instruments:</b> Block diagram, operation, applications, AFM (Atomic Force Microscope), TEM (Tunneling Electron Microscope), STM (Scanning Tunneling Microscope)	<b>16</b>
4.	Mathematical modeling of Nano instruments	<b>4</b>
5.	Nano-control system	<b>2</b>
6.	<b>Graphic user interface:</b> GUI in Nanotechnology instruments, its special needs, ergonomics in GUI	<b>4</b>

## **Reference Books:**

1. From instrumentation to Nanotechnology by Julian W. Gardner, Harry T. Hingle , Taylor & Francis Publication ( ISBN 2881247946)
2. Nanotechnology by Gregory L. Timp, Springer publication (ISBN 0387983341)  
(Material from current magazines, Research Journals and manufacturer datasheets and application notes)