

GUJARAT TECHNOLOGICAL UNIVERSITY
Instrumentation and Control Engineering
B. E. SEMESTER: VII

Subject Name: **Instrumentation for Nanotechnology**

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.	Sensors for Nanotechnology Instruments: 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	6
2.	Low level signal conditioning: 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	20
3.	Nanotechnology Instruments: Block diagram, operation, applications, AFM (Atomic Force Microscope), TEM (Tunneling Electron Microscope), STM (Scanning Tunneling Microscope)	16
4.	Mathematical modeling of Nano instruments	4
5.	Nano-control system	2
6.	Graphic user interface: GUI in Nanotechnology instruments, its special needs, ergonomics in GUI	4

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)