



C. U. SHAH UNIVERSITY
Wadhwan City

FACULTY OF: Technology & Engineering
DEPARTMENT OF: Instrumentation & Control Engineering
SEMESTER: VIII
CODE: 4TE08INT1
NAME: Instrumentation for Nanotechnology

Teaching & Evaluation Scheme

Subject Code	Subject Name	Teaching Hours/Week				Credits	Evaluation Scheme/Semester							
		Th	Tu	Pr	Total		Theory				Practical			Total Marks
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE08INT1	Instrumentation for Nanotechnology	4	0	2	6	5	30	1.5	70	3	--	20	30	150

OBJECTIVES:

1. To acquaint the students with fundamentals Nanotechnology and its applications in Instrumentation engineering.

PREREQUISITES:

1. Basics of various sensors and measurement techniques.

COURSE OUTLINES:

Sr. No.	Course Contents	No Of Hours
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

Learning Outcomes:

1. After studying this course the students would be able to understand the modeling of Nanotechnology based instruments and apply these concepts if and when they pursue a career in this field.

BOOKS RECOMMENDED:

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)