

# **VEER NARMAD SOUTH GUJARAT UNIVERSITY**

## **Post Graduate Diploma In Instrumentation**

### **PAPER- III**

#### **MEASUREMENT INSTRUMENTATION, CONTROL**

Experimental design, transducers, classification of transducers transducer, characteristics, selection of instrumentation transducer transducers as an electrical element, measurement methods, temperature transducers, variable-resistor transducer, differential transformer LVDT, Capacitive, piezo electric and photoconductive transducer, photoemissive detectors, photodiode, phototransistor, ionization transducer magnetic search coil, Hall transducer, digital displacement transducer, strain gages, different type of strain gages , theory and applications of strain gages.

Signal to noise consideration, noise in frequency domain, sources of noise, signal to noise in experimental design, frequency and bandwidth consideration, bandwidth control, signal to noise enhancement, digital correlation and auto correlation methods, signal recovery, signal filtering, signal averaging, signal coding.

Functional Elements of instruments, performance characteristics, statistical analysis.

Fundamental concept of an instrument, input and output, configuration of measuring instruments and instrument systems, methods of correction for Interfacing and modifying inputs, Instrumentation amplifier, basic characteristics, isolation amplifiers.

Electrical measuring instruments, essential of indication instruments, types of electrical instrument. moving coil. Hot-wire and induction instruments electrostatic instruments. watt and energy meters insulation testing magger.

Measurement of displacement force torque and speed.

Methods of pressure measurement . measurement of vacuum , electrical pressure transducers pressure switches. calibration, maintenance and repair of pressure measuring instruments liquid, level measurements. electrical methods, capacitance level. indicator radiation level indicator, servicing of level measuring instruments.

Temperature measurement methods of temperature measurement, Expansion and filled system thermometers electrical temperature instruments, parameters.

Characteristics of vacuum. vacuum system vacuum pumps gauges. pumping speed for a vacuum system, thin film techniques. film thickness measurements and monitors.

1. IEF 488 interfaces bus instrumentation software.
2. Recorders, Automatic controllers and telemetering systems. Digital Voltmeter and multimeters polarography, photovoltaic cell, light emitting diodes .

## **RECOMMEDED BOOKS**

1. **M.Sayer and A.Mansingh, Measurement, Instrumentation and experimental design for physics and engineering PHI, 2000.**
2. **B.E.Jones, Instrumentation. Measurement and control. TMH 1981.**
3. **A.K. Sawhney, A Course in electrical and electronics measurements and instrumentation. Dhentat Rai and Sons. 1998.**
4. **C.S. Rangan G.S. Sharma, V.S.Mani. Instrumentation Devices Systems, TMH,1983, (1998)**
5. **J.P. Holman, Experimental Systems, applications and Design, M.C. Grow Hill 1990.**
6. **F.O.Deoblin Measurement Systems, applications and design, Mc Gro Hill , 1990**
7. **A.J.Difender, Principles of electronic instrumentation. W.B. Saunders (toppan) 1972.**
8. **S.K.Singh, Industrial Instrumentation and Contrl, TMH 1990.**
9. **D.Patranabis, Principals of Industrial Instrumentation, TMH 1996**
10. **J.Jha, M.Puri, R.S.Kanav, M.Kasav. Elements of Electronic Instrumentation, Narosa. !996.**