



# **SNS COLLEGE OF TECHNOLOGY**

## **AN AUTONOMOUS INSTITUTION**

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UGC

### **DEPARTMENT OF FOOD TECHNOLOGY**

**COURSE CODE & NAME: 1**

**III YEAR / V SEMESTER**

**UNIT : I SENSORS AND TRANSDUCERS**

**TOPIC 1 : INTRODUCTION TO MEASUREMENT**





# INTRODUCTION



## Measurement:

- Measurement is the important subsystem.
- Its main function to collect the information on system status.
- To feed it to the micro –processor for controlling the whole system.
- Measurement system comprises of sensors, transducers and signal processing devices.



The basic requirements of a good quality measurement system

- Ruggedness
- Linearity
- No hysteresis
- Repeatability
- High output signal quality
- High reliability and stability
- Good dynamic response



# Functions of instrument and measurement system



## **Indicating Function:**

- This function includes supplying information concerning the variable quantity under measurement.
- Several types of methods could be employed in the instruments and systems for this purpose.
- Most of the time, this information is obtained as the deflection of a pointer of a measuring instrument.



**Recording Function:** In many cases the instrument makes a written record, usually on paper, of the value of the quantity under measurement against time or against some other variable. This is a recording function performed by the instrument. For example, a temperature indicator / recorder in the HTST pasteurizer gives the instantaneous temperatures on a strip chart recorder.



**Controlling Function:** This is one of the most important functions, especially in the food processing industries where the processing operations are required to be precisely controlled. In this case, the information is used by the instrument or the systems to control the original measured variable or quantity.

**Signal Processing:** This function is performed to process and modify the measured signal to facilitate recording / control.

# Applications of Measurement Systems



Different applications of the instruments and measurement systems are:

- i). Monitoring a process/operation
- ii). Control a process/operation
- iii). Experimental engineering analysis



## Monitoring a Process/Operation

- There are several applications of measuring instruments that mainly have a function of monitoring a process parameter.
- They simply indicate the value or condition of parameter under study and these readings do not provide any control operation.
- For example, a speedometer in a car indicates the speed of the car at a given moment, an ammeter or a voltmeter indicates the value of current or voltage being monitored at a particular instant.





## **Control a Process/Operation**

- Another application of instruments is in automatic control systems.

Measurement of a variable and its control are closely associated.

- To control a process variable, e.g., temperature, pressure or humidity etc., the prerequisite is that it is accurately measured at any given instant and at the desired location.
- Same is true for all other process parameters such as position, level, velocity and flow, etc. and the servo-systems for these parameters.



## **Experimental engineering analysis**

- Is carried out to find out solution of the engineering problems.
- These problems may be theoretical designs or practical analysis.
- The exact experimental method for engineering
- analysis will depend upon the nature of the problem.



# ASSESSMENT



- Measurement system comprises of
  1. sensors,
  2. transducers
  3. signal processing devices.
  4. All the above
- Basic requirement of measurement system
  1. Ruggedness
  2. Low input
  3. Low reliability



THANK YOU..."