SNS COLLEGE OF TECHNOLOGY

Coimbatore-35

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DEPARTMENT OF MECHATRONICS

19MCB303– SENSORS AND SIGNAL PROCESSING

UNIT 1 – SCIENCE OF MEASUREMENT

CLASSIFICATION OF TRANSDUCER

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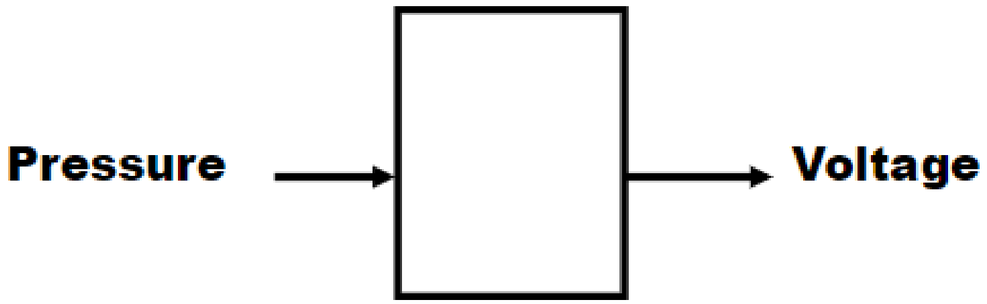
Syllabus

UNIT-I	SCIENCE OF MEASUREMENT	9

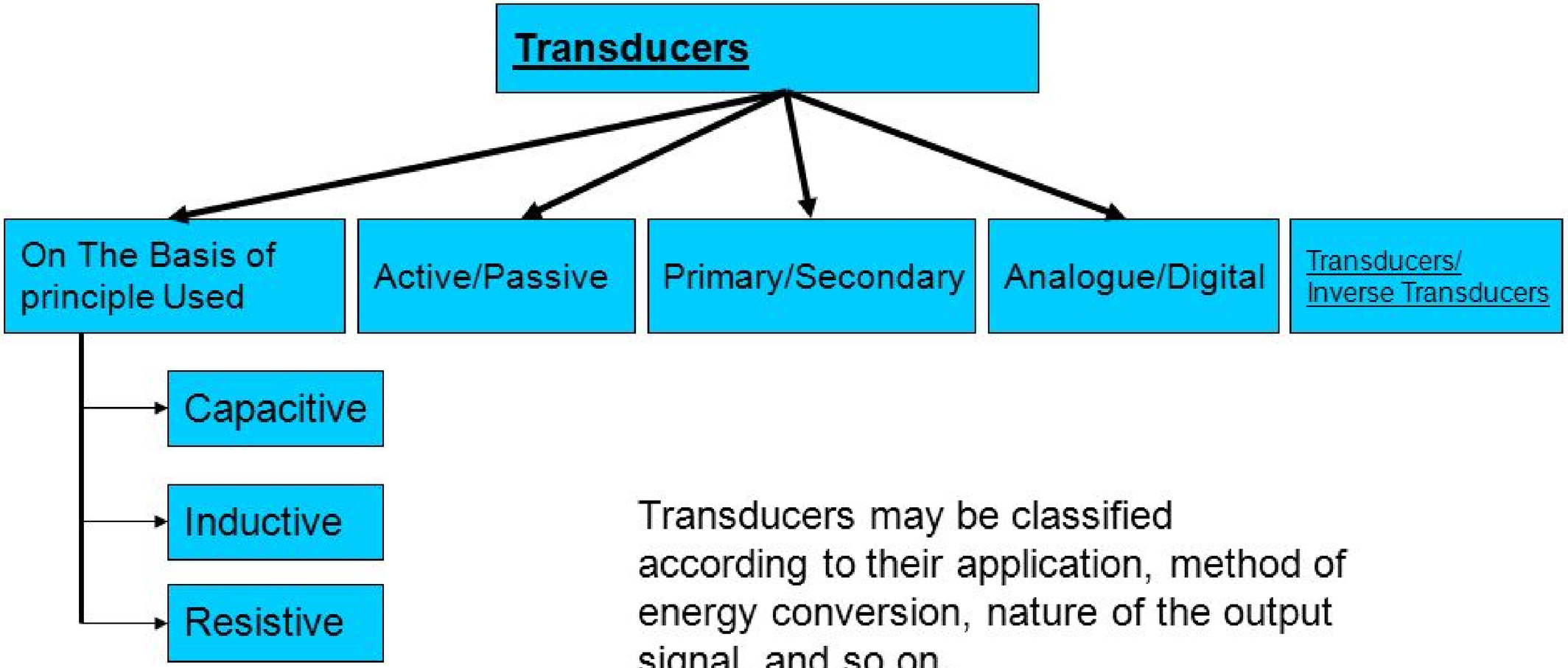
Units and Standards– Calibration techniques –Errors in Measurements– Generalized Measurement System–Static and dynamic characteristics of transducers– Generalized Performance of Zero Order and First Order Systems - Response of transducers to different time varying inputs – Classification of transducers-Introduction to second order systems.

Transducer

- A **Transducer** is a device which converts one form of energy into another form.
- Alternatively, a Transducer is defined as a device which provides usable output response to a specific input measured which may be a physical quantity.
- A Transducer can also be defined as a device when actuated by energy in one system supplies energy in the same form or in another form to a second system.



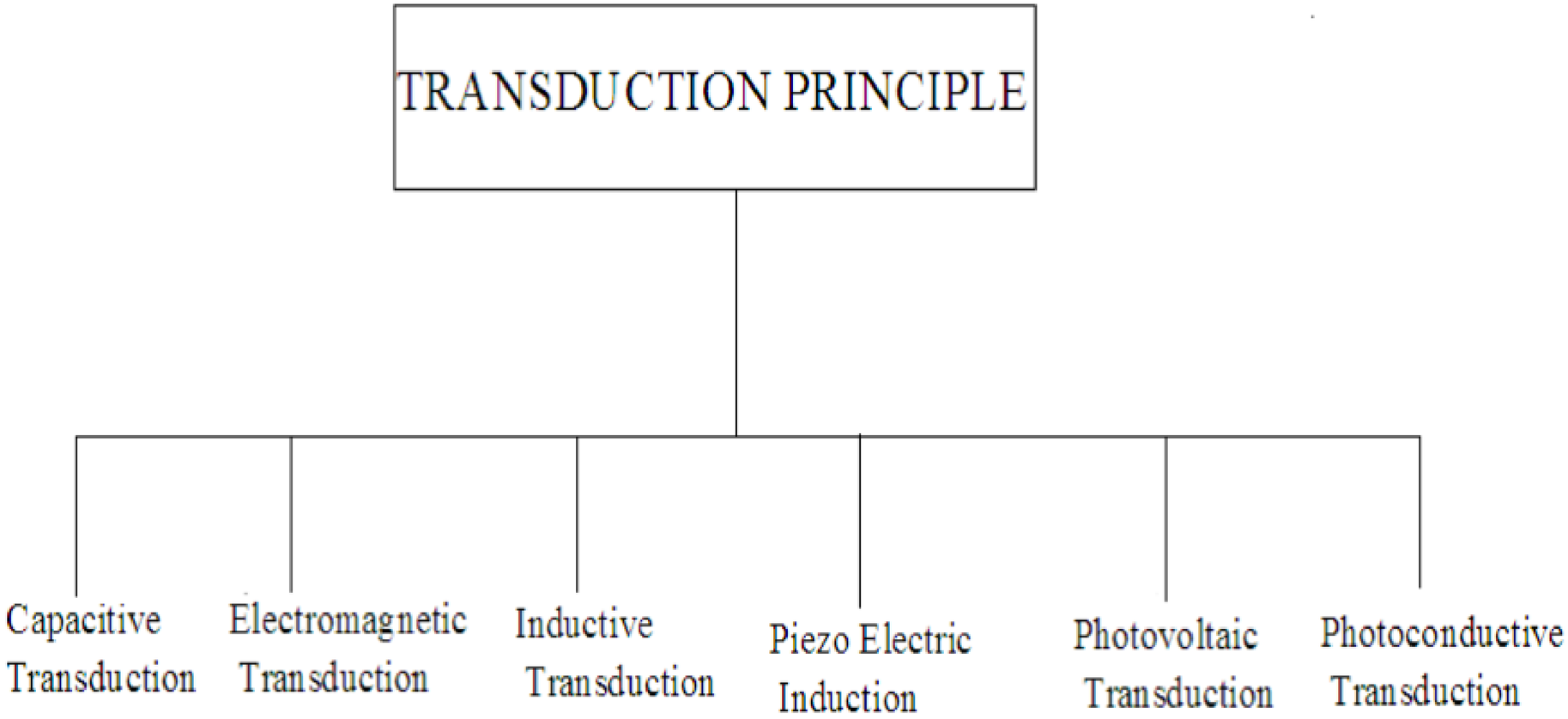
Classification of Transducer



Transducers may be classified according to their application, method of energy conversion, nature of the output signal, and so on.

On the Basis of Transduction Principle

- Capacitive
- Inductive
- Resistive



Active and Passive Transducer

- **Active transducers** are those which don't need auxiliary power source to produce output. The energy required for production of output signal is obtained from physical quantity being measured.
- **Example:** piezoelectric crystals, tacho-generators etc.

- **Passive transducers** are those which need an auxiliary power source to produce output.
- **Example:** linear potentiometer etc.

Primary and Secondary Transducer

- Some transducers contain the mechanical as well as electrical device. The mechanical device converts the physical quantity to be measured into a mechanical signal. Such mechanical device are called as the **primary transducers**, because they deal with the physical quantity to be measured.

- The electrical device then convert this mechanical signal into a corresponding electrical signal. Such electrical device are known as **secondary transducers.**

- **Example:** Bourdon Tube

Analog and Digital Transducer

- **Analog Transducers** convert the input quantity into an analog output which is a continuous function of time.
- **Example**: Strain gauge, an LVDT, Thermocouple or Thermistor

- **Digital Transducers** convert the input quantity into an electrical output which is in the form of pulses and its output is represented by 0 and 1.

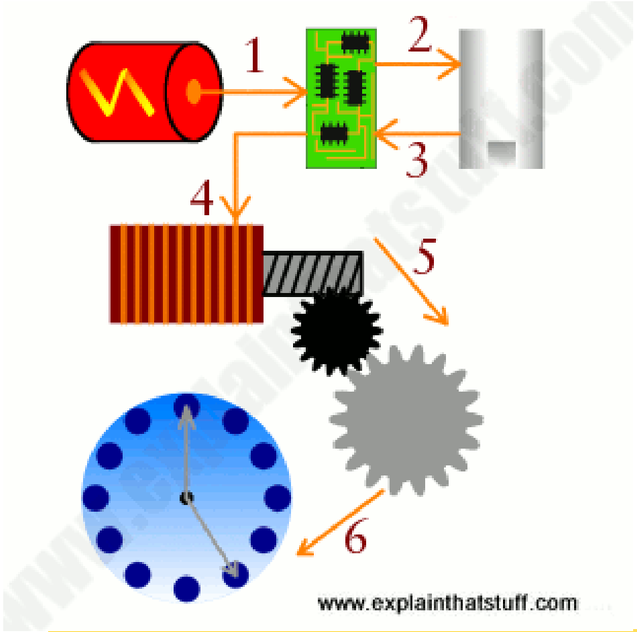
Transducer and Inverse Transducer

- **Transducers** converts non electrical quantity to electrical quantity.

- **Inverse Transducer** converts electrical to non-electrical quantity. This type of transducer convert electrical signal in to required form.
- **Example:** Piezoelectric Crystal.

Applications

- In our mobile phone, Microphones, Speakers and touch screens.
- In our Computer Mouse optical sensor/ transducer is available.
- In our Clock Piezo Crystal is working.
- In our Computer Hard Disk Magnetic Sensor is installed.



Thank You