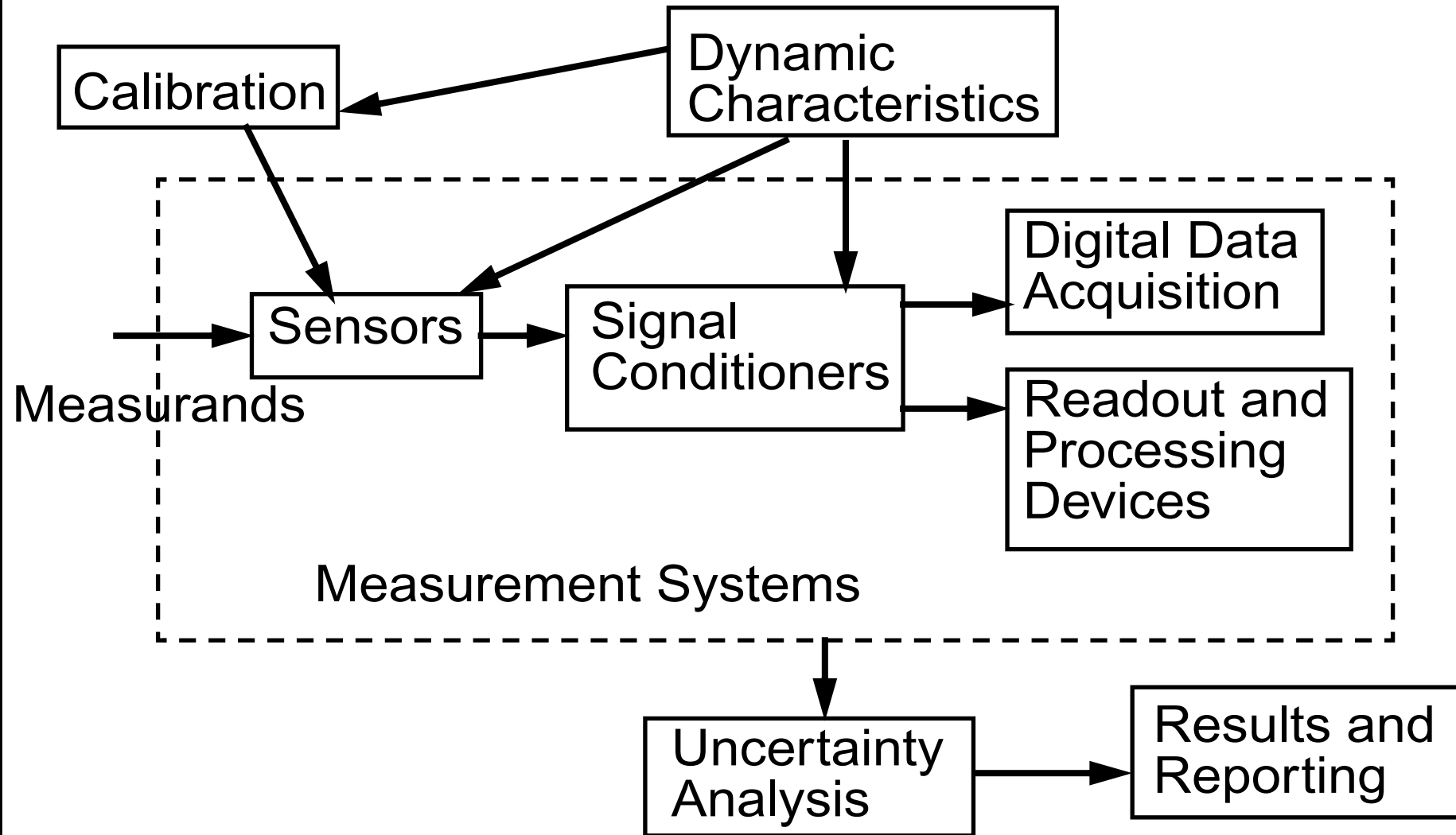


Course Overview



Introduction

Outlines:

- Basic definition
- Accuracy and Precision
- Measurement system
- Calibration: Static calibration

Basic Definition

- **Data:** Information obtained from experiment
- **Variable:** A basic quantity
 - Discrete variable: qualitative measurement
 - Continuous variable
- **Resolution:** smallest increment of change that can be determined from the transducer/instrument readout
- **Sensitivity:** change in the transducer/instrument output per unit change in the measured quantity

Accuracy and Precision

- Accuracy

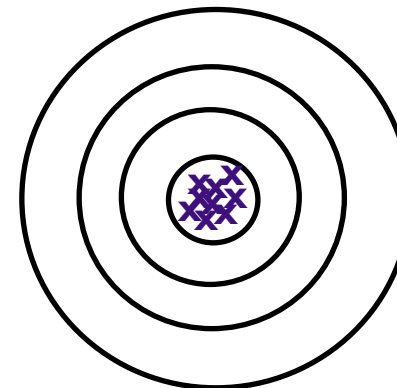
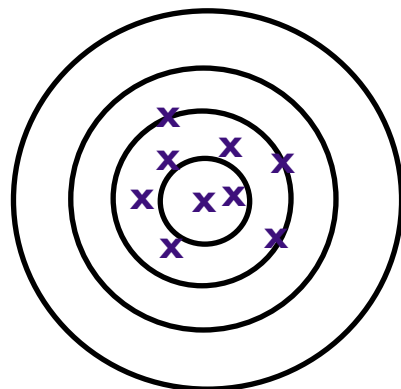
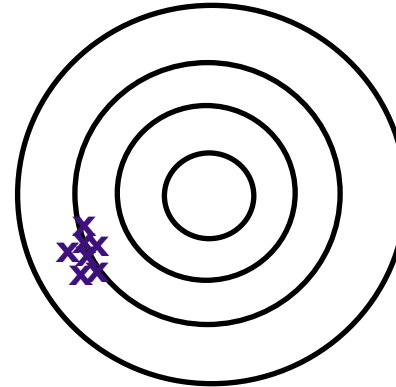
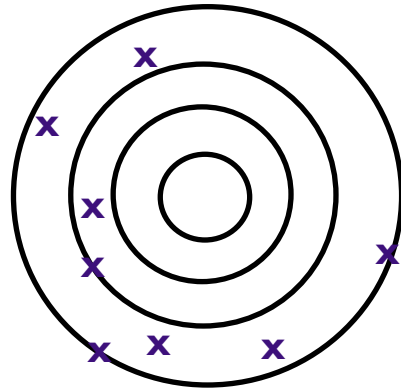
The closeness of a measurement (or set of observations) to the true value. The higher the accuracy the lower the error.

- Precision

The closeness of multiple observations or repeatability of a measurement. Refers to how close a set of measurement to each other.

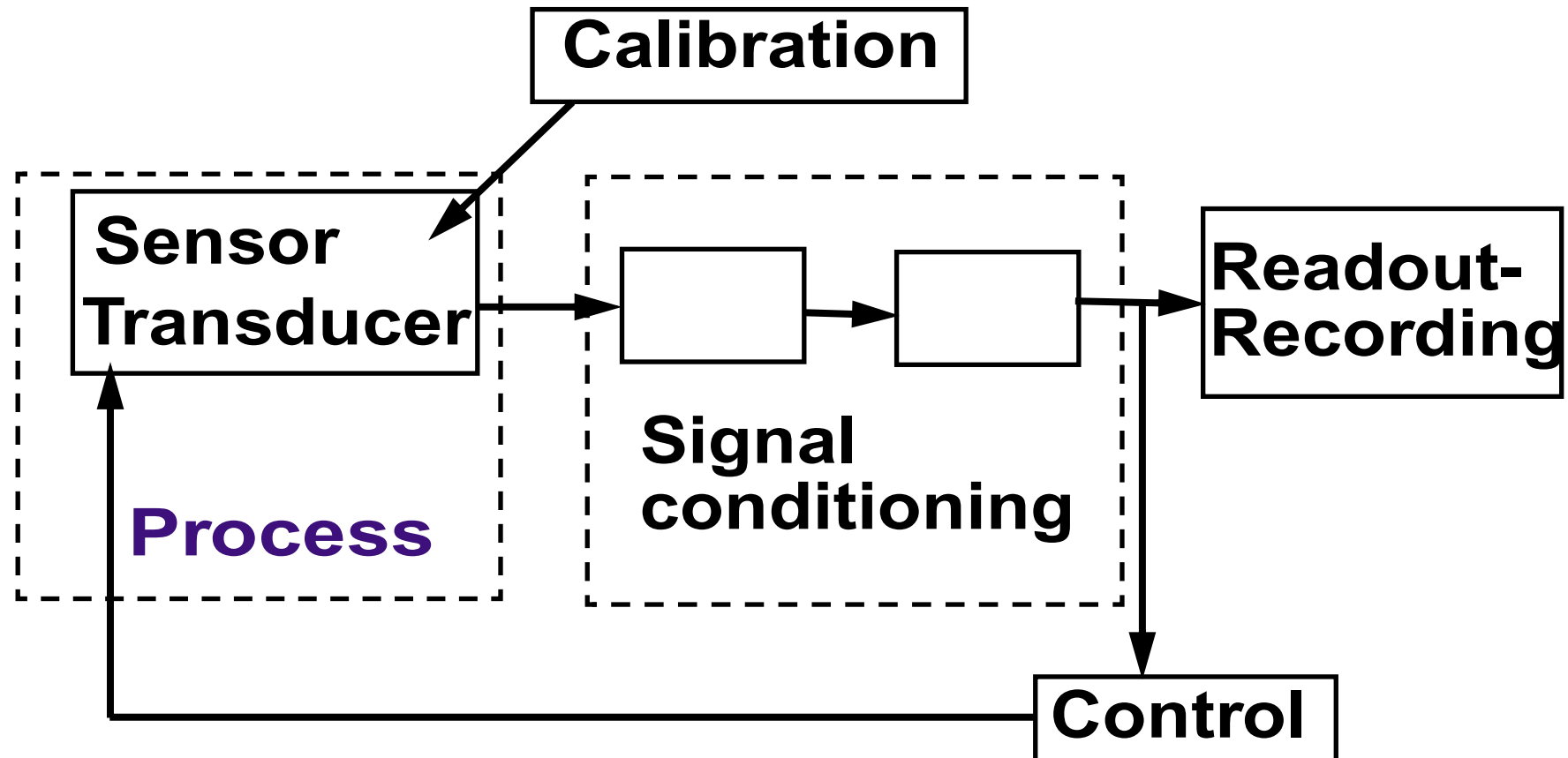
Accuracy vs Precision

Not accurate, not precise *Not accurate but precise*



Not precise but accurate *Precise and accurate*

Measurement Systems



Calibration

Known inputs are fed into the measurement system and outputs of the system are observed.

- Single-point calibration: Output is proportional to input or $Output = Input \times constant$.
- Multi-point calibration: Several inputs are fed. Works when output is not simply proportional to input.