

醫工導論

九十二學年度第一學期

生醫感測器

Transducers for Biomedical Measurements

醫工導論課程規劃

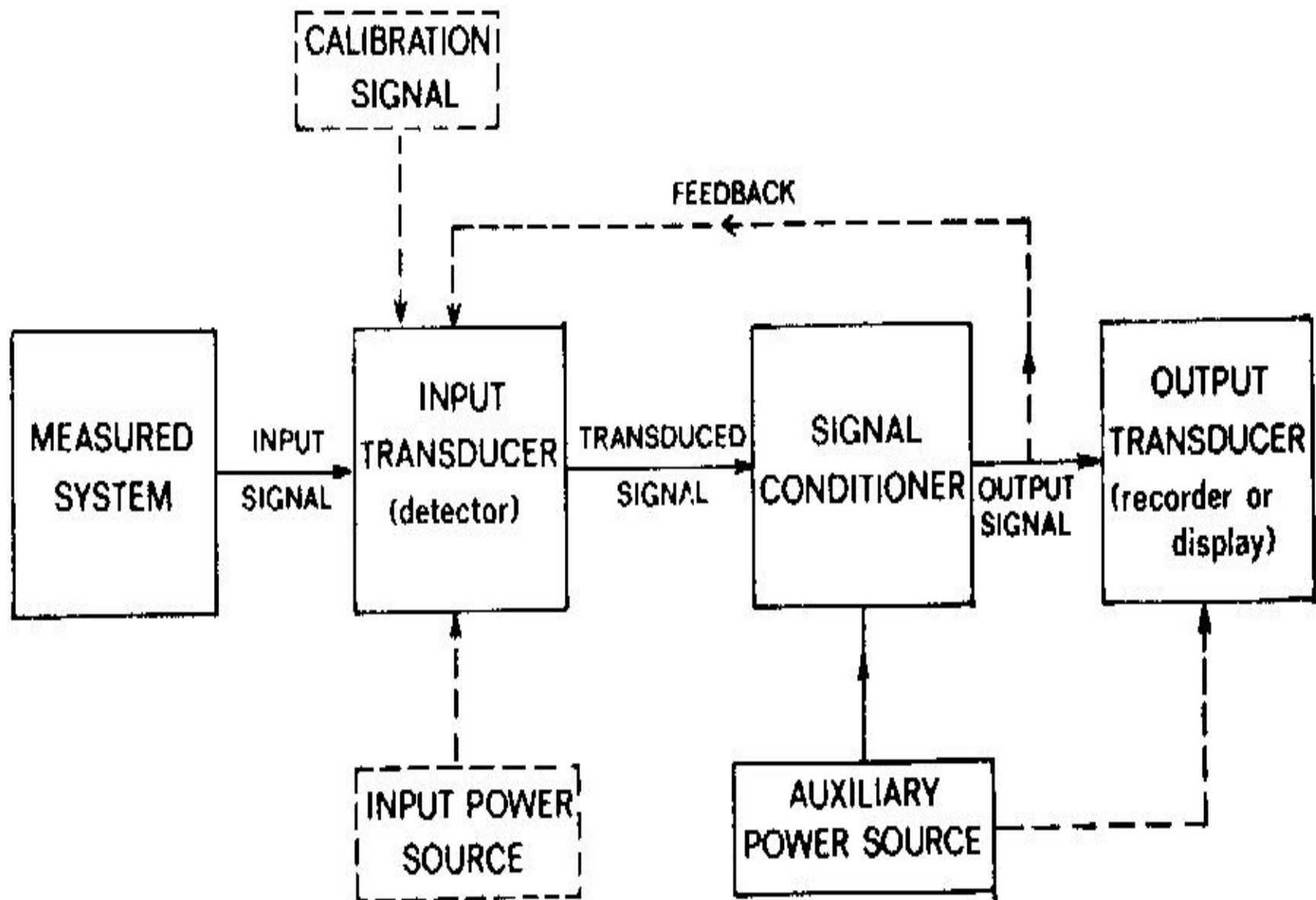
- 醫學資訊
- 人體潛能
- 生醫光電
- 生物晶片光學檢測
- 電腦斷層、核醫
- 磁共振造影
- 生醫超音波技術
- 生醫訊號處理
- 醫療儀器
- 生醫感測器

Transducers for Biomedical Measurements

- I. General Aspects of
Biomedical Transducers (9/16)
- II. Theory & Applications (9/23)

Measurements and transducers

- Purpose of measurements
 - Improve understanding
 - Monitoring
 - Or Control
- The process of measurements
 - Indirect measurement
 - Direct measurement
- Transducers and transduction events



Criteria for error free measurements

- Linearity
- Hysteresis
- Sampling error
- Phase distortion
- Amplitude distortion
- Input and out impedance effect

General Properties of Input Transducers

- Active & Passive
- Digital and Analog
- Primary and Secondary
- Specification and choices

II: Theory & Applications (9/23)

- Temperature transducers
- Pressure transducers
- Displacement, motion, & force transducers
- Flow measurement transducers
- Electrodes for the measurement of bioelectric potential

Temperature Transducers

- Thermoresistive Transducers
- Thermoelectric Transducers
- P-N junction diode Thermometers

Pressure Transducers

- Direct Hydraulically coupled system
- Indirect blood pressure measurement

Displacement, motion, & force transducers

- Displacement
- Force transducer
- Velocity and acceleration transducers

Flow Measurement Transducers

- Electromagnetic methods
- Ultrasound flow transduction
- Pressure gradient
- Thermal transport flow transducers
- Venous Occlusion plethysmography
- The Fick and rapid injection dilution

Electrodes for the measurement of bioelectric potential

- Electrical behavior of electrodes
 - Impedance matching
 - Electrode DC offset voltage
 - Electrode noise and drift

Electrophysiological Signal Applications and Opportunity

- DOLCE – Directly Obtained Laplacian Cardiac Electrogram
- Laplacian EMG system integration
- ORANGE – Localized body fat monitor
- www.biosensetek.com
- AMCC medical device fund