Biomedical Instrumentation
BIS-100

Life Sciences

Course Content includes:

Electrocardiogram (ECG)
- Understand the phenomenon of the action potential when the heart beats

Electromyogram (EMG)
- Understand the electrical activity of the muscle under the isotonic and isometric conditions and simultaneously detect the amount of muscle force

Electrooculogram (EOG)
- Understand the electrical activity of the eye muscle under the eye movement

Electroencephalogram (EEG)
- Understand the electrical activity of the brain

Oscillometric Blood Pressure
- Realize how to handle and measure the noninvasive blood pressure by noninvasive method, and compare the accuracy with the ascultator method and oscillometric method

Photoplethysmogram Measurement
- Understand how to use the noninvasive method and configure the circuit to detect and process the Plethysmogram

Respiratory Ventilation Detection
- Understand how to use a temperature sensor and configure the circuit to detect and process the respiratory signal including stop breathing capacity, over-respiration and respiratory rate

Pulse Meter
- Understand how to use the strain gauge and configure the circuit to detect and process the radial pulse waveform, and learn vascular characteristics under different transmural pressure condition

Body Impedance Detection
- Understand how to detect the body impedance

Quick View
- Our training equipment is designed for basic theory and circuit design of physiological measurements
- Hands-on measurements will help students develop an understanding of human physiology and biomedical instrumentation

System Components
- BI-100 Textbook
- BI-100-40 Workbook
- BI-100-30 Student Parts Pack

Optional Accessories
- ECG Simulator
- Digital Storage Oscilloscope
- Signal Generator: 0.1 Hz - 10 KHz
- EEG Simulator
- Alcohol Prep Pad
- Body Surface Electrode

Prerequisites
- None

Preliminary*

*Subject to change without notice

HEATHKIT EDUCATIONAL SYSTEMS

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Biomedical Instrumentation

unitEXPERIMENTS

Unit 1
Electrocardiogram (ECG)

1 HPF Characteristic
2 Amplifier
3 LPF Characteristic
4 BEF Characteristic
5 Simulator ECG
6 Human Body ECG

Unit 2
Electromyogram (EMG)

1 LPF Characteristic
2 Amplifier
3 HPF Characteristic
4 Half-wave Rectifier Characteristic
5 Integrator Characteristic
6 EMG
7 Isometric Contraction
8 Isotonic Contraction
9 Muscular Fatigue

Unit 3
Electrooculogram (EOG)

1 Horizontal & Vertical Electro Circuit Calibration
2 HPF1 Characteristic
3 Amplifier 1
4 LPF 1 Characteristic
5 HPF 2 Characteristic
6 Amplifier 2 Characteristic
7 LPF 2 Characteristic
8 EOG

EXPERIMENTS (continued)

Unit 4
Electroencephalogram (EEG)

1 Pre-amplifier Calibration
2 HPF Characteristic
3 Amplifier
4 LPF Characteristic
5 Simulator EEG
6 Human Body EEG

Unit 5
Oscillometric Blood Pressure

1 Pressure Sensor Calibration
2 HPF 1 Characteristic
3 LPF Characteristic
4 HPF 2 & Amplifier Characteristic
5 Use Auscultator Blood Pressure Measurement
6 Use Oscillometric Blood Pressure Measurement

Unit 6
Photoplethysmogram Measurement

1 HPF Characteristic
2 Amplifier 1
3 LPF 1 Characteristic
3 LPF 2 Characteristic
5 Differentiator
6 Amplifier 2
7 Comparator
8 Monostable Multivibrator
9 Human Body Photoplethysmogram Measurement

EXPERIMENTS (continued)

Unit 7
Respiratory Ventilation Detection

1 Differential Amplifier Calibration
2 Amplifier
3 Differentiator
4 Hysteresis Comparator
5 Monostable Multivibrator
6 Respiratory Ventilation Detection

Unit 8
Pulse Meter

1 Strain Gauge Amplifier Calibration
2 HPF Characteristic
3 Amplifier
4 LPF Characteristic
5 Hysteresis Comparator
6 Monostable Multivibrator
7 Pulse Meter
8 Artery Vein

Unit 9
Body Impudence Detection *

1 Pre-Amplifier Calibration
2 Oscillator
3 HPF Characteristic
4 Demodulator
5 Amplifier
6 LPF Characteristic
7 Impudence Detection

** People with a cardiac pacemaker must avoid using this unit*

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