



Jordan University of Science and Technology
Faculty of Engineering
Biomedical Engineering Department

BME412 Biomedical Instrumentation Lab

First Semester 2023-2024

Course Catalog

1 Credit Hours. 1 Credit hour (3 h lab). Measurement errors and noise; sensor interface circuit calibration; signal conditioning, amplification, filtration, processing, physiological principle and principle of circuit design of some biomedical measurement devices: ECG, oscillometric blood pressure measurement, photoplethysmogram measurement, respiratory ventilation detection, pulse meter and body impedance detection.

Text Book

Title	Biomedical Measurements System KL-720 Experiment Manual
Author(s)	KL-720
Edition	1st Edition
Short Name	Ref #1
Other Information	Experiment Manual

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref #2	Medical Instrumentation: Application and Design	John G. Webster	4th Edition	

Instructor

Name	Dr. Yazan Al Dweiri
Office Location	C5 L2
Office Hours	Sun : 08:30 - 09:30 Sun : 10:30 - 12:00 Tue : 10:30 - 13:00 Wed : 08:30 - 11:30 Thu : 10:30 - 12:30
Email	ymaldweiri@just.edu.jo

Class Schedule & Room
Section 2: Lecture Time: Wed : 14:30 - 17:30 Room: LAB

Prerequisites		
Line Number	Course Name	Prerequisite Type
284110	BME411 Biomedical Instrumentation	Prerequisite / Study

Tentative List of Topics Covered		
Weeks	Topic	References
Week 1	Introduction to the Lab	
Week 2	Electrocardiogram (ECG) measurement: the characteristics of high-pass filter and amplifier	
Week 3	Electrocardiogram (ECG) measurement: the characteristics of low-pass filter and band-reject filter and human ECG measurement using scope	
Week 4	Oscillometric Blood Pressure measurement.: calibrating the pressure sensor driver and the characteristics of high pass, low pass filter and amplifier.	
Week 5	Oscillometric Blood Pressure measurement: Measuring the characteristics of rectifier and blood pressure measurement using stethoscope, oscillometric sensor and scope	
Week 6	Vessel volume measurement: Calibrating infrared photo-coupler sensor and measuring the characteristics of high-pass filter, low-pass filter and amplifier.	
Week 7	Vessel volume measurement: Measuring the characteristics differentiator, comparator and mono-stable multivibrator and Human vessel volume measuring using scope.	
Week 8	Respiratory frequency measurement: Measuring the characteristics of band-reject filter, amplifier and differentiator.	
Week 9	Respiratory frequency measurement: Respiratory frequency measurement using scope.	
Week 10	Pulse measurement	
Week 11	Body impedance measurement	

Mapping of Course Outcomes to Program Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Detect ECG signals from six: Measuring the characteristics of ECG filters circuit and different leads of human body [1SO1, 1SO5, 1SO6, 1SO7]	15%	

Realize the piezoelectric property of pressure sensor in addition to direct and indirect calibration methods for blood pressure registration [1SO2, 1SO4, 1SO5, 1SO6]	15%	
Learn the non-invasive measurement of vessel volume [1SO5, 1SO6, 1SO7]	15%	
Measurements of respiratory activities, including breath holding ability, excessive ventilation and frequency of respiratory [1SO1, 1SO5, 1SO6, 1SO7]	25%	
Realize the alteration of pulse waveform in arteries under different external pressures. In addition, learn how to estimate the arterial static compliance [1SO1, 1SO5, 1SO6, 1SO7]	15%	
Measure body impedance variations during heart cycle [1SO1, 1SO5, 1SO6]	15%	

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
18.75	3.75		3.75	27.5	27.5	18.75

Date Printed: 2023-11-29