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

BME 511 Sensors and Biomeasurements Lab

2013 Course Catalog

1 Credit hours (3 h lab) Measuring , analyzing and extracting different parameters from different bio signals, ECG, Pulse Plethysmography, Breathing volumes and parameters, in addition to audiometry and biomedical equipment safety analysis.

Textbooks

Sensors and Biomeasurements Lab Handouts, JUST-Biomedical Engineering Dept.

References

Books

- Lab handouts.
- Medical International Research (MIR) company, Spirobank II
- IWorx 214/CB Sciences, INC HK/214 Human Physiology Teaching Kit Laboratory Manual.
- 601 PRO International Safety Analyzer Operators Manual.

Journals

- Annals of Biomedical Engineering
- IEEE transactions on Medical Imaging
- Biomedical Computing
- IEEE Instrumentation and Measurements

Instructor

Instructor **Dr. Khaldoon Lweesy** , E-mail: klweesy@just.edu.jo

Prerequisites

Prerequisites by topic Biomedical Instrumentation Lab, Biomedical Sensors and Transducers
Prerequisites by course BME 412, BME 413
Co-requisites by course BME 413
Prerequisite for

Evaluation

Topics Covered

Week	Topics	Experiments
1	Introduction to the Lab	
2	Human Psychophysiology/Electroencephalogram (EEG)	
3	Human Spirometry	Lab Handout
4	Human Muscle	
5	Safety Analyzer	
6	Pulmonary Function Test	
7	Audiometry	
8	Lab view Experiments	

Assessment Tool	Expected Due Date	Weight
Pre Lab Reports	Turned in at the beginning of the lab session	5%
Post Lab Reports	Turned in at the end of the lab session (The late submission policy for Post lab reports is as follows: *For each day -15%.maximum 3 days)*	15%
Quizzes and Performance	Quizzes are given at the beginning of each lab	10%

Mid Exam	According to the department schedule	20 %
Final Exam	According to the University final examination schedule	40 %
Lab view project		10%

Objectives and Outcomes[1]

Objectives	Outcomes
1. To become familiar with the Lab Scribe software for measuring EEG, EMG and Respiratory signals [1,6,8,9]	1.1 Record EEG signal and identify its artifacts [6,8,9] 1.2 Measure a subject's grip strength and record EMG activity for the dominant and non-dominant forearms muscles [1,6,9] 1.3 Determine the rate of fatigue in the dominant and non-dominant forearms [1,6 1.4 Recognize the breathing parameters VC, RV, TV, …..etc. [8] 1.5 Understand the factors that affect breathing patterns [6,8]
2. To understand the principles involved in performing electrical safety measurements on medical devices [2,4,6]	2.1 Perform acceptance tests on medical devices using an electrical safety analyzer that include main voltage, dual lead voltage, current consumption, insulation resistance, protective earth resistance, earth leakage current, enclosure leakage current , patient leakage current, …etc. [2,4,6]
3. To understand and analyze different respiratory parameters VC, FVC, and MVV using Spiro bank and Win Spiro program [1,6,8,9]	3.1 Understand how to prepare PFT patient data [1,6] 3.2 Recognize the effect of exercise on respiratory parameters [8,9]
4. To familiarize the student with audiometer [6,8]	4.1 Familiarize the student with hearing test equipment, audiogram and the relation between frequencies and attenuations [6,8]
5. Encourage life long learning, foster teamwork and enhance student's communication skills. [1, 3, 4,5,7]	5.1 Design and conduct experiments in teams [4, 5] 5.2 Write a report for each experiment analyzing and explaining the results [1, 3, 6, 7]

Contribution of Course to Meeting the Professional Component

The course contributes to building the fundamental basic concepts and applications of cell and molecular biotechnology in Biomedical Engineering.

Relationship to Program Outcomes (%)

1	2	3	4	5	6	7	8	9
7	11	18	5	18	13	3	14	11

Relationship to Biomedical Engineering Program Objectives

PEO1	PEO2	PEO3	PEO 4
√	√	√	√

Prepared by: Dr. Khaldoon Lweesy
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[1] Lower-case letters in brackets refer to the Program outcomes