



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

BME413 Biomedical Sensors And Transducers - JNQF Level: 7

First Semester 2024-2025

Course Catalog

3 Credit Hours. 3 Credit hours (3 h lectures). Introduction to biomedical sensors: definition, classification, calibration, requirements, errors and uncertainty, static and dynamic parameters, requirements and design aspects of signal conditioning circuits, temperature sensors: types, and signal processing circuits, Pressure sensors: types, operating principle, calibration techniques, medical applications and conditioning procedures, Electrochemical sensors, ion-selective sensors, Biosensors, ion-sensitive field effect chemo-sensors, optical sensors, Ultrasound transducers, Intelligent biomedical sensors, manufacturing of biomedical sensors.

Teaching Method: Blended

Text Book

Title	Sensors and Signal Conditioning
Author(s)	Ramon Pallas-Areny and John G. Webster
Edition	2nd Edition
Short Name	Ref #1
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref #2	The Biomedical Engineering Handbook	Bronzino, J.	2nd Edition	

Instructor

Name	Prof. Mashhour Bani-Amer
Office Location	C2 L1
Office Hours	
Email	m-b-amer@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Sun, Tue : 09:30 - 10:30 Room: M2011

Prerequisites		
Line Number	Course Name	Prerequisite Type
283140	BME314 Medical Electronics li	Prerequisite / Study

Tentative List of Topics Covered		
Weeks	Topic	References
Weeks 1, 2	Introduction to Biomedical Sensors	
Weeks 2, 3	Resistive Sensors and their signal conditioning	
Weeks 4, 5, 6	Reactance Variation and Electromagnetic Sensors	
Weeks 7, 8, 9	Self-Generating Sensors and Signal Conditioning	
Weeks 10, 11	Optical Sensors	
Weeks 12, 13	Ultrasound Transducers	
Week 14	Intelligent Sensors	
Weeks 15, 16	Biosensors	

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Analyze errors and uncertainty of experimental results obtained from biomedical sensors [1SO1, 1SO2, 1SO4, 1SO7] [1L7K1]	10%	
Understand requirements, calibration, characteristics and parameters of biomedical sensors [1SO1, 1SO4, 1SO6, 1SO7] [1L7S2]	10%	
Design with confidence signal conditioning systems required for processing the sensors reponses [1SO2, 1SO3, 1SO5, 1SO6] [1L7S3]	10%	
Understand the operating principle, types, parameters, signal conditioning, and applications of resistive, reactance variation and self-generating sensors [1SO1, 1SO2, 1SO4, 1SO6] [1L7K1]	15%	
Study the design, operating principle, types, parameters, and signal conditioning, and applications of electrochemical sensors and biosensors [1SO1, 1SO2, 1SO4, 1SO6] [1L7S1]	15%	
Understand the operating principle of different types of optical sensors and their features [1SO1, 1SO2, 1SO4, 1SO6] [1L7K1]	10%	

Understand the operation, models and parameters of ultrasound transducers [1SO1, 1SO2, 1SO6] [1L7S2]	10%	
Understand the design, main building blocks, features and calibration of intelligent sensors [1SO1, 1SO4, 1SO6, 1SO7] [1L7S1]	10%	
Encourage life long learning, foster teamwork and enhance students' communication soft skills [1SO1, 1SO3, 1SO4, 1SO5, 1SO7] [1L7C1]	10%	

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
22.83	18.33	4.5	19.5	4.5	20.83	9.5

Relationship to NQF Outcomes (Out of 100%)				
L7K1	L7S1	L7S2	L7S3	L7C1
35	25	20	10	10

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