



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

BME462 Microcontrollers And Embedded Systems

Second Semester 2022-2023

**Course Catalog**

3 Credit Hours. 3 Credit hours (3 h lectures). Introduction to Microcontroller based systems; architecture, hardware fundamentals, basic programming using Arduino environment, sensor and output interface, specialized digital communication, with biomedical engineering applications.

**Text Book**

<b>Title</b>	Introduction to Embedded Systems: Using ANSI C and the Arduino Development Env.
<b>Author(s)</b>	David Russell
<b>Edition</b>	1st Edition
<b>Short Name</b>	Ref #1
<b>Other Information</b>	

**Course References**

Short name	Book name	Author(s)	Edition	Other Information
Ref #2	Arduino Cookbook	Michael Margolis	2nd Edition	

**Instructor**

Name	<b>Dr. Yazan Al Dweiri</b>
Office Location	C5 L2
Office Hours	Sun : 11:30 - 13:00 Tue : 13:30 - 14:30 Wed : 14:00 - 15:30 Thu : 08:00 - 10:00
Email	ymaldweiri@just.edu.jo

**Class Schedule & Room**

Section 1:

Lecture Time: Sun, Tue, Thu : 10:30 - 11:30

Room: M2011

**Prerequisites**

Line Number	Course Name	Prerequisite Type
282300	BME230 Tools For Biomedical Engineers	Prerequisite / Study
284211	BME421 Digital Signal Processing	Prerequisite / Study
283140	BME314 Medical Electronics li	Prerequisite / Study

**Tentative List of Topics Covered**

Weeks	Topic	References
Week 1	Discuss Syllabus and Course Structure, and basic concepts of embedded systems	
Week 2	Introduction to computer architecture, digital numbering systems and digital logic gates	
Week 3	Digital Logic Gates	
Week 4	Digital control, ALU & RAM	
Week 5	System-level Instructions	
Week 6	Introduction to Arduino compatible boards and working with digital Inputs/Outputs	
Week 7	Analog Inputs and A/D basics and LCD & user-defined functions	
Week 8	Driving high-current devices and system calibration and distance measurements	
Week 9	Working with biopotentials	
Week 10	Sampling frequency and processing optimization for RT systems	
Week 11	Real-time signal processing and FIR system implementation	
Week 12	Digital communication protocols: I2C and SPI and datalogging and wireless connectivity	
Week 13	Biomedical Engineering applications	
Week 14	Projects Week	

Mapping of Course Outcomes to Program Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Introduce fundamental concepts of computer architecture [1SLO1, 1SLO7]	15%	
Introduce hardware and software integration and instruction controls [1SLO1, 1SLO2, 1SLO6, 1SLO7]	15%	
Identify the various aspects of Arduino compatible boards [1SLO1, 1SLO4, 1SLO7]	20%	

Link between the hardware and software optimization [1SLO1, 1SLO2, 1SLO7]	15%	
Apply programming skills to develop customized software [1SLO1, 1SLO2]	20%	
Apply different microcontrollers communication approaches [1SLO1, 1SLO2, 1SLO6, 1SLO7]	15%	

Relationship to Program Student Outcomes (Out of 100%)																			
A	B	C	D	E	F	G	H	I	J	K	L	M	SLO1	SLO2	SLO3	SLO4	SLO5	SLO6	SLO7
													36.67	22.5		6.67		7.5	26.67

Date Printed: 2023-12-14