

## COURSE PLAN

### FIRST: BASIC INFORMATION

#### College

College	Karak College
Department	Engineering Department

#### Course

Course Title	Microcontroller II
Course Code	020406242
Credit Hours	3(1 Theoretical, 2 Practical)
Prerequisite	020406241

#### Instructor

Name	
Office No.	
Tel (Ext)	
E-mail	
Office Hours	

#### Class Times

	Sunday	Monday	Tuesday	Wednesday	Thursday
Building	Day	Start Time	End Time	Room No.	

#### Textbook

- Microcontroller II, Al-Balqa Applied University & KOICA, 2022

#### References

- Michael Margolis et al., "Arduino Cookbook," 3rd Ed. , O'Reilly Media, 2020
- J.M. Hughes, "Arduino: A Technical Reference," O'Reilly Media, 2012

### SECOND: PROFESSIONAL INFORMATION

#### COURSE DESCRIPTION

This course explains how to increase the usability and make them applicable to various fields as a result. Microcontrollers can utilize a variety of peripherals, which allow them to interact with different environments. Input devices represented by sensors, various output devices, and wireless communication devices for the Internet environment are covered in this course.

#### COURSE OBJECTIVES

The objectives are to:

- Apply the acquired knowledge to connect and program the input devices to microcontroller.
- Apply the acquired knowledge to connect and program the output devices to microcontroller.
- Apply the acquired knowledge to communicate data via WiFi & Bluetooth
- Design real life applications using microcontrollers.

#### COURSE LEARNING OUTCOMES

By the end of the course, the students will be able to:

- CLO1. Explain the characteristics of movement sensors and use them in practice

CLO2. Explain the characteristics of distance sensors and use them in practice  
 CLO3. Explain the characteristics of weather sensors and use them in practice  
 CLO4. Explain the characteristics of sound sensors and use them in practice  
 CLO5. Explain the characteristics of displays and their control methods  
 CLO6. Explain the characteristics of a servo motor and control methods  
 CLO7. Explain the characteristics of infrared communication and use it in practice  
 CLO8. Apply Bluetooth wireless communication in a microcontroller-based project  
 CLO9. Develop various application using Wi-Fi  
 CLO10. Differentiate various kinds of memories in microcontroller and use them efficiently

### COURSE SYLLABUS

Week	Topics	Topic details	Related OL	Proposed Assignments
1	Movement related Sensors	<ul style="list-style-type: none"> <li>• Detecting Movement.</li> <li>• Detecting Motion of Living Things.</li> <li>• Tracking Rotary Movement</li> </ul>	CLO1	
2	Distance related Sensors	<ul style="list-style-type: none"> <li>• Measuring Distance.</li> <li>• Measuring Distance Precisely</li> <li>• Getting Location from a GPS</li> </ul>	CLO2	
3	Weather related Sensors	<ul style="list-style-type: none"> <li>• Measuring Temperature.</li> <li>• Measuring Humidity.</li> <li>• Measuring Barometric Pressure.</li> </ul>	CLO3	
4	Sound related Sensors	<ul style="list-style-type: none"> <li>• Detecting Sound</li> <li>• Digital Microphone.</li> <li>• Detecting Vibration.</li> </ul>	CLO4	
5	Display	<ul style="list-style-type: none"> <li>• Type of Display</li> <li>• Afterimage Effect</li> <li>• Connecting and Using Dot Matrix</li> </ul>	CLO5	
6	Display	<ul style="list-style-type: none"> <li>• Characteristics of OLED</li> <li>• Connecting and Using OLED</li> <li>• Special effects on OLED</li> </ul>	CLO5	
7	Servo Motor	<ul style="list-style-type: none"> <li>• Feedback in servo motor</li> <li>• Controlling servo position.</li> <li>• Controlling servo speed.</li> </ul>	CLO6	
8		<b>Midterm Exam</b>		
9	Remote control	<ul style="list-style-type: none"> <li>• Responding Infrared Remote-Control.</li> <li>• Decoding Infrared Remote-Control Signals.</li> <li>• Imitating Remote Control Signals.</li> </ul>	CLO7	
10	Bluetooth	<ul style="list-style-type: none"> <li>• How Bluetooth Works.</li> <li>• Bluetooth Profiles.</li> <li>• Serial Bluetooth Modules</li> <li>• Bluetooth module connection.</li> </ul>	CLO8	
11	Bluetooth	<ul style="list-style-type: none"> <li>• Communicating with Bluetooth Devices.</li> <li>• Exchanging data with a computer via Bluetooth</li> <li>• Exchanging data with a mobile device via Bluetooth</li> </ul>	CLO8	

Week	Topics	Topic details	Related OL	Proposed Assignments
		<ul style="list-style-type: none"> <li>Introduction to BLE(Bluetooth Low Energy)</li> </ul>		
12	WiFi	<ul style="list-style-type: none"> <li>How WiFi Works</li> <li>Serial WiFi Modules (ESP8266, ESP32, etc.)</li> <li>Setup serial WiFi modules using AT command</li> </ul>	CLO9	
13	WiFi (Internet Client Example)	<ul style="list-style-type: none"> <li>Scanning access points</li> <li>Connecting to an access point</li> <li>Obtaining an IP address automatically</li> <li>Requesting Data from a Web Server</li> <li>Extracting Data from a Web Response</li> </ul>	CLO9	
14	WiFi – (Internet Web Server Example)	<ul style="list-style-type: none"> <li>Setting up a microcontroller to be a web server</li> <li>HTML page design</li> <li>Servicing room temperature</li> </ul>	CLO9	
15	Memories in Arduino	<ul style="list-style-type: none"> <li>Memories in Microcontroller</li> <li>Storing and Retrieving data in Program Memory(Flash memory)</li> <li>Lookup data in EEPROM.</li> <li>Efficient use of RAM</li> </ul>	CLO10	
16		<b>Final Exam</b>		

### COURSE LEARNING RESOURCES

This module will be taught using available resources including lectures, and materials uploaded to the e-learning system.

### ONLINE RESOURCES

<https://www.best-microcontroller-projects.com/pic-projects.html>

### ASSESSMENT TOOLS

Assessment Tools	%
Projects and Quizzes	20%
MID Exam	30%
Final Exam	50%
Total Marks	100%

### THIRD: COURSE RULES

#### ATTENDANCE RULES

Attendance and participation are extremely important, and the usual University rules will apply. Attendance will be recorded for each class. Absence of 10% will result in a first written warning. Absence of 15% of the course will result in a second warning. Absence of 20% or more will result in forfeiting the course and the student will not be permitted to attend the final examination. Should a student encounter any special circumstances (i.e. medical or personal), he/she is encouraged to discuss this with the instructor and written proof will be required to delete any absences from his/her attendance records.

**GRADING SYSTEM**

Grade	Points
<b>FAILED</b>	<b>0-49</b>
<b>PASSED</b>	<b>50-100</b>

**REMARKS**

- Copying assignments, quizzes, or exams from another student will not be tolerated.
- Helping other students to cheat in any way or form will not be tolerated.
- Excellent attendance is expected.
- BAU policy requires the faculty member to assign ZERO grade (F) if a student misses 20% of the classes without a valid excuse.
- If student miss a class, it is his responsibility to find out about any announcements or assignments he/she may have missed.
- Participation in, and contribution to class discussions will affect the final grade positively.
- Making any kind of disruption (side talks or mobile ringing) in the class is not allowed and it will affect student negatively.
- Makeup exam should not be given unless there is a valid excuse according to BAU policies.

**COURSE COORDINATOR**

<b>Course Coordinator:</b>	<b>Department Head:</b>
<b>Signature:</b>	<b>Signature:</b>
<b>Date:</b>	

Dr. Nasr Gharaibeh