COURSE PLAN

FIRST: BASIC INFORMATION

College	
College	: Karak College
Department	: Engineering Department

Course	
Course Title	: Embedded System
Course Code	: 020406244
Credit Hours	: 3 (2 Theoretical, 1 Practical)
Prerequisite	: 020406241

Instructor					
Name	:				
Office No.	:				
Tel (Ext)	:				
E-mail	:				
Office Hours	:				
Class Times	Building	Day	Start Time	End Time	Room No.

Text Book
1. Embedded System, Al-Balqa Applied University & KOICA, 2022

References
1. Derek Molloy, "Exploring Raspberry Pi Interfacing to the Real World with Embedded Linux", John Wiley & Sons, Inc., 2016. 2. Simon Monk, "Raspberry Pi Cookbook, Software and Hardware Problems and Solutions" 3rd Edition, O'Reilly Media, 2020.

SECOND: PROFESSIONAL INFORMATION

COURSE DESCRIPTION

This course explores the definition of embedded systems and various applications using embedded systems. Specifically, Raspberry Pi, one of the most widely adopted embedded platforms, is discussed in terms of hardware and software. including embedded Linux, connecting peripherals, programming Raspberry Pi, and wireless communication methods.

COURSE OBJECTIVES

The objectives of this course are to enable the student to do the following:
- Explain Raspberry Pi hardware and software
- Explain architecture and design principles of embedded systems including Raspberry Pi
- Apply the acquired knowledge to develop embedded software including Raspberry Pi
- Connect peripherals and control them through embedded software
- Expand embedded system with different kinds of communication protocols.
- Design web based applications using embedded system including Raspberry PI

COURSE LEARNING OUTCOMES

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

CLO1. Explain the concept of embedded system and Raspberry Pi
CLO2. Work with Raspberry Pi operating system and software
CLO3. Develop program for Raspberry Pi platform
CLO4. Develop and analyze of electronic circuit connected to Raspberry Pi
CLO5. Explain the Raspberry PI platform components and their functionality
CLO6. Develop a code for controlling Raspberry Pi using C/C++
CLO7. Create an embedded system project using general purpose input/output pins
CLO8. Explain wireless communication available to embedded system
CLO9. Explain the concept of Bluetooth and its application
CLO10. Develop and run client and server application with WiFi

COURSE SYLLABUS

Week	Topic	Topic Details	Reference (Chapter)	Proposed Assignments
1	Raspberry Pi (Hardware)	• Introduction to Raspberry Pi • RPi Documentation. • The RPi Hardware. • Raspberry Pi Accessories. • HATs (Hardware Attached on Top).	CLO1	
2	Raspberry Pi (Software)	• Raspbian: Linux on Raspberry Pi. • Installing Linux on Raspberry Pi • Connecting to a Network	CLO2	
3	Raspberry Pi (Software)	• Controlling the Raspberry Pi. • Configuring the Raspberry Pi. • Interacting with the Onboard LEDs.	CLO3	
4	Exploring Embedded Linux Systems	• Introducing embedded Linux • Managing Linux systems • Using Git for Version Control	CLO3	
5	Interfacing Electronics	• Analyzing Your Circuits • Basic Circuit Principles. • Implementing Raspberry Pi Circuits on a Breadboard	CLO4	
6	Interfacing Electronics	• Discrete Components. • Logic Gates. • Analog-to-Digital Conversion	CLO5	
7	Programming on the Raspberry Pi	• Programming methods • Scripting Languages. • Dynamically Compiled Languages.	CLO6	
8	Mid Exam			
9	Programming on the Raspberry Pi	• C and C++ on the Raspberry Pi • Overview of Object-Oriented Programming. • Interfacing to the Linux OS.	CLO6	

Week	Topic	Topic Details	Reference (Chapter)	Proposed Assignments
10	Interfacing to the Raspberry Pi Input/Outputs	• Interfacing to Raspberry Pi • General-Purpose Input/Outputs. • C++ Control of GPIOs.	CLO7	
11	Interfacing to the Raspberry Pi Input/Outputs	• Memory-Based GPIO Control. • Wiring Pi. • Analog-to-digital conversion • Digital-to-analog conversion	CLO7	
12	Wireless Communication	• The basic of wireless communication. • Connecting Raspberry PI platform into Local Network. • Wireless control of Raspberry Pi • Running and testing Raspberry Pi platform over a network.	CLO8	
13	Bluetooth	• The concept of Bluetooth. • Connecting Bluetooth into Raspberry PI platform. • Connecting sensors and actuators via Bluetooth.	CLO9	
14	Wi-Fi – Client	• Introducing client application. • Developing Client application. • Interfacing sensors and actuators.	CLO10	
15	Wi-Fi - Server	• Introducing server application. • Developing server application. • Interfacing sensors and actuators.	CLO10	
16	**Final Exam**			

COURSE LEARNING RESOURCES

This module will be taught using available resources including:
- Class lectures, lecture notes, assignments, quizzes, and exams designed to achieve the course objectives.
- Lectures and materials uploaded to the e-learning system.
- Student should read the material covered in class, complete assignments on time, participate in class discussions, and do whatever it takes to grasp the topics.

ONLINE RESOURCES

Any web site or tutorial that offers information about the basics and principles of power electronics analysis.

ASSESSMANT 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

The grading system for the Diploma Degrees in the Al-Balqa' Applied University is the total mark out of 100%

GRADE	POINTS
FAILED	0-49
PASSED	50-100

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 35 grades if a student misses 15% 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

Course Coordinator: **Department Head:**

Signature: **Signature:**

Date: **Date:**