



## COURSE PLAN

### FIRST: BASIC INFORMATION

College											
College	: Karak College										
Department	: Engineering Department.										
Course											
Course Title	: Circuit Design										
Course Code	: 020406213										
Credit Hours	: 3 (1 Theoretical, 2 Practical)										
Prerequisite	: 020406112										
Instructor											
Name	:										
Office No.	:										
Tel (Ext)	:										
E-mail	:										
Office Hours	:										
Class Times	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20%; height: 20px;"></td> </tr> <tr> <td style="height: 20px;"></td> </tr> </table>										
Text Book											

- **Circuit Design**, Al-Balqa Applied University & KOICA, 2022.

### References

- Simon Monk, “**Make Your Own PCBs with Eagle**” McGraw-Hill, 2014
- Clyde Coombs and Happy Holden, “**Printed Circuits Handbook**” 7th Ed., McGraw-Hill, 2016

### SECOND: PROFESSIONAL INFORMATION

#### COURSE DESCRIPTION

This course explains how to implement an electronic circuit as a printed circuit board (PCB). It also deals with the design rules to be satisfied and efficient PCB design methods required by the industry. For PCB design, a dedicated program commonly used in industry will be used.

#### COURSE OBJECTIVES

**The objectives of this course are to enable the student to do the following:**

- **Explain** the basic principles for circuit design
- Apply the tools and techniques used for circuit design in their own PCB design
- Test and debug the operation of designed PCB by simulation



- Design a PCB that complies with industry standards

### COURSE LEARNING OUTCOMES

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

- CLO1. Install and use PCB design software, EAGLE
- CLO2. Examine the construction techniques that used to build a prototype
- CLO3. Identify how to design PCB
- CLO4. Determine the electronic components and types used in the simulation
- CLO5. Explain how to build the simulated circuits
- CLO6. Examine the measuring skills for electrical values by simulation
- CLO7. Classify the tools used in circuit design
- CLO8. Determine the circuit behavior
- CLO9. Design their own PCM using EAGLE

### COURSE SYLLABUS

Week	Topic	Topic details	Related LO	Proposed assignments
1	Rules and symbols in schematic	<ul style="list-style-type: none"> <li>• Printed Circuit Boards</li> <li>• Installing EAGLE</li> <li>• Install Third-Party Software.</li> </ul>	CLO1	
2	Rules and symbols in schematic	<ul style="list-style-type: none"> <li>• Surface Mount and Through Hole.</li> <li>• Prototyping boards</li> <li>• Load an Example Project.</li> </ul>	CLO2	
3	Design rule checking and create new PCB	<ul style="list-style-type: none"> <li>• Creating a New Project.</li> <li>• Add the Components.</li> <li>• Join the components Together.</li> </ul>	CLO3	
4	Design rule checking and create new PCB	<ul style="list-style-type: none"> <li>• Electrical Rule Check.</li> <li>• Laying Out the Board.</li> <li>• Dragging Components onto the Board</li> </ul>	CLO3	
5	Design rule checking and create new PCB	<ul style="list-style-type: none"> <li>• Resizing the Board.</li> <li>• Routing.</li> <li>• U.S. versus European Circuit Symbols</li> </ul>	CLO3	
6	Component selection	<ul style="list-style-type: none"> <li>• Through-Hole Resistors.</li> <li>• SMD Resistors.</li> <li>• Through-Hole Capacitors.</li> <li>• SMD Capacitors.</li> </ul>	CLO4	
7	Component selection	<ul style="list-style-type: none"> <li>• Through-Hole Transistors.</li> <li>• SMD Transistors and Diodes.</li> <li>• Through-Hole ICs (DIL).</li> <li>• SMD ICs.</li> <li>• Connectors and other components</li> </ul>	CLO4	
8		<b>Mid exam</b>		



Week	Topic	Topic details	Related LO	Proposed assignments
9	Setting up PCB layers	<ul style="list-style-type: none"> <li>• The Anatomy of the Schematic Editor.</li> <li>• Common Commands.</li> <li>• Other Commands</li> </ul>	CLO5	
10	Setting up PCB layers	<ul style="list-style-type: none"> <li>• Nets.</li> <li>• Buses.</li> </ul>	CLO5	
11	Setting up PCB layers – Example Project	<ul style="list-style-type: none"> <li>• Starting the Schematic.</li> <li>• Adding the Components.</li> <li>• Adding the Supplies.</li> <li>• Adding the Nets.</li> <li>• Assigning Net Classes.</li> <li>• Running the ERC.</li> </ul>	CLO5	
12	Routing and completion of design	<ul style="list-style-type: none"> <li>• Experimenting.</li> <li>• Layers.</li> <li>• The Grid.</li> <li>• Layout methods</li> </ul>	CLO6	
13	Soldering	<ul style="list-style-type: none"> <li>• General Tools.</li> <li>• Tools for Surface-Mount Devices.</li> <li>• Through-Hole Soldering Step by Step.</li> </ul>	CLO7	
14	Soldering	<ul style="list-style-type: none"> <li>• Soldering Two- and Three-Legged Components.</li> <li>• Soldering IC Packages.</li> <li>• Using a Reflow Oven.</li> </ul>	CLO8	
15	An Arduino Shield	<ul style="list-style-type: none"> <li>• Introducing Arduino.</li> <li>• Shield Design.</li> <li>• Arduino R3 Shield Template.</li> <li>• A Four-Digit LED Example.</li> </ul>	CLO9	
16		<b>Final exam week</b>		

### COURSE LEARNING RESOURCES

Teaching will be achieved using available resources including lectures, data show, and materials uploaded on the e-learning system.

### ONLINE RESOURCES

- [www.element14.com/community/community/knode/cadsoft\\_eagle/forums/](http://www.element14.com/community/community/knode/cadsoft_eagle/forums/).
- [www.youtube.com/watch?v=1AXwjZoyNno](http://www.youtube.com/watch?v=1AXwjZoyNno).



- [www.cadsoftusa.com/downloads/libraries](http://www.cadsoftusa.com/downloads/libraries)

### ASSESSMENT TOOLS

Assessment Tools	%
0Projects 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

#### Example:

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

### REMARKS

{The instructor can add any comments and directives such as the attendance policy and topics related to ethics }

### COURSE COORDINATOR

**Course Coordinator:** Eng.mahmoud aljafari

**Department Head:**

**Signature:** Eng.mahmoud aljafari

**Signature:**

**Date:**

**Date:**