Future Academy
Higher Future Institute for Specialized Technological Studies

Course Specification

1- Course information:

Course Code:	BSC131
Course Title:	Electronics
Year/level	1st
Academic Programs	Computer Science Program (B.Sc.)
Contact hours/ week	(Theoretical=2hrs, Practical = 1hr / Tutorial= 2hrs), Total =6hrs

2- Course aims:

The module gives the students an idea about semiconductors with their two main devices, namely, PN-junction diodes and transistors. The students learn the main characteristics of these devices. Thereafter, diodes and transistors are used to build electronic circuits which perform different specific functions. It also, introduces circuit theorems and problem solution to analyze circuits. The student should learn the operation of power supply, transformers, rectifiers, and operational amplifiers.

3- Intended learning outcomes of the course (ILOs):

a- Knowledge and understanding:

On successful completion of this course, the student should be able to:
a-1 Recognize the requirements and criteria that apply to analyze particular electric circuit problems and develop solution strategies .
a-2 Identify reasoning to solve Arduino circuit problems from a pseudocode outline of a program to a complete code implementation
a-3 Recognize the basic concepts of hardware and software architectures for Arduino circuits and applications.

b- Intellectual skills:

On completing this course, the student should be able to:
b-1 Apply and evaluate the ideas, principles, theories, and methods that are used to Construct and analyze electronic circuits of specified functions.
b-2 Compare between different electronic circuit theorems.
b-3 Interpret characteristics, elements, connections, trends, primary concepts, and faults of an electronic circuit of the specified function.

c- Professional and practical skills:

At the end of this course, the student will be able to:
c-1 Investigate and analyze the physical characteristics, capacities, and constraints of Arduino-based circuits before operating them .
c-2 Apply a solution for circuit analysis problems using appropriate circuit theorem at various complexity levels.
c -3 Apply computational skills to appropriate code libraries.

d- General and transferable skills:

On successful completion of this course, the student should be able to:
d-1 Manage your time, teamwork, group collaboration, and organizing abilities.
d2- Learning different scientific terminologies related to Arduino-based circuits

4- **Course contents**

No. Week	Topics/units	Number of hours		ILO's
		Lecture hours	Practical hours	
1	Introduction to electric circuits	2	3	a1
2	Electric current and Ohm's Law, Kirchhoff's Laws	2	3	a1,b1
3	Elements of Electric circuits	2	3	a3,b3,d1
4	Circuit Theorems: Superposition , Thevinen, Norton, Power Transfer + Quiz 1.	2	3	a1,b2,c1,d1
5	Semiconductor diodes:	2	3	a1,b2,c1,d1
6	Introduce the band theory of solids to differentiate among insulators.	2	3	a2,b2,b3,c1,d2
7	Mid Term			
8	conductors and semiconductors.	2	3	a2,b2,c3,d2
9	Semiconductor diodes; Diode applications	2	3	a2,b1,c3,d2
10	Half-wave and Full-wave rectification.	2	3	a2,b1,c3,d2
11	Transformers + Quiz 2	2	3	a2,b1,b3,c2,c3,d2
12	Power Supply circuit	2	3	a3,b3,c2,c3,d2
13	Operational Amplifier	2	3	a2,b3,c1,d2
14	Examples for practical IOT-based circuits	2	3	

5- Teaching and learning methods

Methods	ILO's																			
	a1	a2	a3	a4	a5	b1	b2	b3	b4	b5	c1	c2	c3	c4	c5	d1	d2	d3	d4	d5
Lectures	√	√	√			√		√				√								
Practical sections							√	√				√	√			√	√			
Self-learning							√	√				√				√				
Assays and reviews					√						√									
Discussion groups							√	√				√				√	√			
Brainstorming																				
Blended-learning																				
E-learning																				

6- Teaching and learning methods for Low-achieving students

- Extra teaching hours for those who need help
- More quizzes to assess their ability to understand the course
- Encourage the team work between those students with other advanced ones to increase their participation and understanding

7- Student assessment

Assessment method	Time	Grade weight (%)	Week	ILOs
Course Work (Tutorial Exercise and Assignments)	Through the semester	10	Every week	
Quiz 1	Through the lecture	5	Week#4	
Mid-term exam	1 hour	10	Week#7	
Quiz 2	Through the lecture	5	Week#11	
Practical Exam	2 hours	10	Week#14	
Final Written exam	2 hours	60	Week#15-16	

8- List of references

8.1. Student notebooks:

- Comprehensive instructor notes ("Power Points Slides") are available on the course web page ("Google Classroom").

8.2. Essential textbooks:

- **"Fundamentals of Electric Circuits", Charles K. Alexander and Matthew n. o. Sadiku, 5th Edition, ISBN 978-0-07-338057-5**
- **"Electronic devices", Thomas L. Floyd, 9th edition.**

8.3. Recommended textbooks:

- **"Electronic devices and circuit theory", Robert L. Boylestad& Louis Nashelsky**

8.4. Journals, Periodical and Reports ……..etc.

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8.5. Websites

- **https://www.circuitbread.com/**
- https://ohmify.com/

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