



**Future Academy**  
**Higher Future Institute for Specialized Technological Studies**

**Course Specification**

**1- Course information:**

<b>Course Code:</b>	CSC 434
<b>Course Title:</b>	Internet of Things
<b>Year/level</b>	4 <sup>th</sup>
<b>Academic Programs</b>	Computer Science Program (B.Sc.)
<b>Contact hours/ week</b>	(Theoretical = 2, Practical = 2, Total = 4)

**2- Course aims:**

This course aims to provide students with comprehensive knowledge regarding the fundamental concepts of Cutting-edge technology such as Internet of Things (IoT) which has potential to add impact how individuals live and work by providing a source of innovative decision making. The design of IoT, which is defined as "an internetworking of physical items – each embedded with sensors – that are connected to the Internet", requires the understanding of embedded electronics, software, sensors, network, and data analytics. To prepare our students as forerunners of this future, this course will introduce a wide range of topics in the broad areas of IoT, and provide hands-on experiences via a series of exciting projects.

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

**a- Knowledge and understanding:**

**On successful completion of this course, the student should be able to:**

- a1- **Recognize** the impact of IoT, its revolution, evolution and Fleet Management in different domains.
- a2. **Present** the characteristics of IoT
- a3- **Identify** the main communication model and architecture IoT architecture
- a4. **Define** Explain the standards and the best practices of IoT
- a5. **list** the various sensors and platforms supporting IoT

**b- Intellectual skills:**

**On completing this course, the student should be able to:**

b1- **Discuss** the standardized and design considerations of IoT

b2- **Clarify** some desirable Applications of IoT

b3. **Discuss** the difference between M2M and IoT

b4- **Describe** the Importance of using IoT in Data Analytics.

#### **c- Professional and practical skills:**

**At the end of this course, the student will be able to:**

c1- **Show** Internet of Things Life Cycle.

c2- **Analyze** the digital transformation *with industry 4.0*

c3- **Examine** Opportunities with IoT in Business.

c4. **Prepare** the standardized and design considerations of IoT

#### **d- General and transferable skills:**

**On successful completion of this course, the student should be able to:**

d1- **Compute** the personal responsibility by working to multiple deadlines in relation to the course requirements.

d2- **Working in groups** to the deployment of communication skills.

### **4- Course contents**

<b>Wee k No.</b>	<b>Topics/units</b>	<b>Number of hours</b>		<b>ILO's</b>
		<b>Lecture hours</b>	<b>Practical hours</b>	
1	Introduction to Internet of Things	2	2	a1, c1,
2	Internet of Things Applications	2	2	a1, b2,
3	Internet of Things Communication model	2	2	a2, b1, c2, c4,
4	Introduction to The Elements of Green + Quiz 1	2	2	a1,
5	IoT Architectures and Components	2	2	a2, b1, c4, d1
6	Sensors Based devices	2	2	a4, a5,
7	Midterm Exam			
8	Communication Technologies	2	2	a3, b1, c4, d1
9	Introduction to IoT development and the ESP32 platform	2	2	a5, b2, b3,

10	Understanding the Development Tools	2	2	a5, b2, c3
11	Using ESP32 Peripherals + Quiz 2	2	2	a4, b2,
12	Interfacing with sensors over Inter-Integrated Circuit (I <sup>2</sup> C)	2	2	a5, d1
13	Employing Third-Party Libraries in ESP32 Projects	2	2	a4, a5, b2, b4, d1, d2
14	Projects Discussion	2	2	d1, d2

## 5- Teaching and learning methods

Methods																	
	a1	a2	a3	a4	a5	b1	b2	b3	b4	c1	c2	c3	c4	c6	d1	d2	
Lectures	√	√	√	√	√	√	√			√	√		√			√	
Training visits																	
Practical sections							√	√	√						√		
Self-learning												√					
Summer training																	
Problem solving																	
Assays and reviews																	
Discussion groups																√	

## 6- Teaching and learning methods for Low-achieving students

- Additional teaching office hours for those who need help.
- More assignments to assess their ability for understanding the course.
- Encourage the teamwork for 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	a3, a4, d1, a5, b2, b3, d1
Quiz 1	Through the lecture	5	Week#4	a1, a2, b2, c1
Mid-term exam	1 hours	10	Week#7	a3, a4, b1, b2, c3
Quiz 2	Through the lecture	5	Week#11	a4, a5, b4
Practical exam	2 hours	10	Week#14	c4, d1
Final Written exam	2 hours	60	Week# 15-16	a2, a3, a5, b1, b2 , c1, c3

## 8- List of references

### 8.1. Student notebooks:

Comprehensive instructor notes ("PowerPoint slides") are available on the course web page ") Google Classroom ("

### 8.2. Essential textbooks:

- GREEN INTERNET OF THINGS, Bandana Mahapatra and Anand Nayyar, 1<sup>st</sup> Edition, ISBN-13: 978-1-032-06913-5, 2023
- Practical Python Programming for IoT: Build advanced IoT projects using a Raspberry Pi 4, MQTT, RESTful APIs, WebSockets, and Python 3, Gary Smart, 1<sup>st</sup> Edition, ISBN-13: 978-1838982461

### 8.3. Recommended textbooks:

- Developing IoT Projects with ESP32 " Unlock the full Potential of ESP32 in IoT development to create production-grade: Vedat Ozan Oner, 2<sup>nd</sup>, ISBN-13: 978-1803237688, 2023

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

### 8.5. Websites

- <https://www.techtarget.com/iotagenda/definition/Internet-of-Things-IoT>
- <https://www.javatpoint.com/iot-internet-of-things>

- <https://www.geeksforgeeks.org/architecture-of-internet-of-things-iot/>

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