



جمهورية مصر العربية

وزارة التعليم العالي والبحث العلمي

Ministry of Higher Education and Scientific Research



المعهد العالى للحاسبات وتكنولوجيا المعلومات
مدينة الشروق - القاهرة
شعبة علوم الحاسب

Course specification

Course Code: CS 455

Course Title: Internet Of Things

Academic Year: /

Course specification
(CS 455: Internet Of Things)

Course Outline

Faculty:	<i>HICIT- (Higher Institute for Computers & Information Technology-El Shorouk Academy)</i>		
Programme(s) on which the course is given:	Undergraduate program in Computer Science		
Major or minor element of programme:	Compulsory		
Department offering the program	Department of Computer Science		
Department offering the course:	Department of Computer Science		
Level	4 st Year – 2 nd semester		
Date of specification approval	/ /2023		

Basic Information

Code:	CS 455	Title:	Internet Of Things
Prerequisites:	CS 250: Computer Networks		
Weekly Hours:			
Lecture: 2	Exercise:	Practical : 2	Total: 3

Professional Information

Course Aims:

Fundamentals of Internet of Things (IOT) course begins by explaining the different basic concepts that are happening behind the Internet of Things (IoT) and will teach you how Internet of Things (IOT) are created. You will be introduced to very useful connectivity terminologies as well as the network configuration of the Internet of Things (IOT) and gateways. You will get familiar with the essential building blocks of the Internet of Things IOT, which includes sensors and actuators. By the end of the course you will know about the types of sensors, their features and their different functionalities.

Program ILOs Covered by Course

Knowledge and understanding	Intellectual Skills	Professional and practical skills	General and Transferable skills
A9, A10, A17, A19	B9 , B11 , B14, B20	C3 , C4	D3 , D12

Intended learning outcomes of course (ILOs)

A. Knowledge and Under-Standing:

- a1- Plan an IoT implementation. [A9, A10, A17]
- a2- Construct and program an IoT device. [A10]
- a3- Communicate with an IoT device using wired and wireless connections. [A10, A19]
- a4- Process sensor input and control an actuator on an IoT device. [A10]
- a5- Manage security, privacy, and safety risks on IoT projects. [A9, A10]
- a6- Manage an IoT prototyping and development project throughout the development lifecycle. [A9, A10]

B. Intellectual Skills:

- b1-Students will emerge from the class with a cutting-edge education on this rapidly emerging technology segment, and with the confidence to carry out tasks they will commonly encounter in industrial settings. [B9]
- b2- Analyse performance of industrial IoT systems [B9, B14]
- b3- Design IoT system hardware and software. [B9]

C. Professional and practical skills

- c1-Students will be guided through laboratory assignments designed to give them practical real-world experience, where they will deploy a distributed wifi monitoring service, a cloud-based iot service platform serving tens of thousands of heartbeat sensors, and more. [C3, C4]
- c2- Implement IoT firmware using embedded systems. [C3, C4]

D. General and transferable skills

- d1- Interpret and apply national and International IoT standards. [D3, D12]
- d2- Apply professional skills to solve industry problems using IoT approaches. [D3, D12]
- d3- Work as a part of a team to produce report. [D3, D12]
- d4- Interpret and apply national and International IoT standards. [D3, D12]

Contents

Topic	Contact Hours	
	lecture	Lab
Introduction to IoT systems & techniques, and applications	3	3
IoT reference and industrial standards	3	3
IoT subsystems: Sensing, Actuating	4	4
Networking and Connectivity	5	3
Low power embedded systems	3	3
Distributed systems	4	4
Cloud and Edge IoT systems	3	5
Basics of IoT security	6	2
Performance analysis of IoT systems	4	4
Real-time IoT system design	3	3

Teaching and learning methods

Teaching and learning methods	Used

Lectures	√
Tutorial Exercises	√
Practical Lab	√
Discussions.	√
Self – Learning (Reading material, Websites search,)	√
Group work	√
Presentation	√
Problem solving/problem solving learning based	√
Case study	√
Synchronous E-Learning	√
Video lectures	√
Asynchronous E-Learning	√

Student assessment methods & Schedule

Methods	Used	Week#
Midterm Exam	√	8
Final Exam	√	16
Course Project	√	3-14
Course Work & Quizzes	√	2-14
Practical Exam	√	15

Assessment Weight

Assessment	Weight %
Mid Term Exam	10%
Practical Exam and Project	10%
Final Exam	70%
Course Work & Quizzes	10%
Total	100

Course Work & Quizzes

Short Exams, Assignments, Research, Reports, Presentations
Class/Project discussion

List of references

Essential books (textbooks)	<p>Internet of Things Technologies and Applications for a New Age of Intelligence 1st Edition - April 8, 2014 Write a review Authors: Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stamatis Karnouskos, Stefan</p> <p>Internet of Things Technologies and Applications for a New Age of Intelligence 1st Edition - April 8, 2014 Write a review Authors: Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stamatis Karnouskos, Stefan</p>
Course notes	E-Learning Portal
Recommended books	
Periodicals, website	

Videos link	
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Required Facilities

Tools & SW (Technology facilities):	- Paython, TensorFlow	
Teaching facilities:	Whiteboard	√
	Computer Lab	√
	Data show	√
	E-Learning	√
	Videos	√
	Website	√

Course Content/ILO Matrix

Course Contents	Knowledge & understanding						Intellectual skills			Professional and practical skills		General			
	a1	a2	a3	a4	a5	a6	b1	b2	b3	c1	c2	d1	d2	d3	d4
Introduction to IoT systems & techniques, and applications	x								x					x	
IoT reference and industrial standards		x							x				x		x
IoT subsystems: Sensing, Actuating			x							x				x	
Networking and Connectivity				x				x		x	x				x
Low power embedded systems					x			x			x	x		x	x
Distributed systems					x			x	x			x	x		
Cloud and Edge IoT systems					x		x	x	x					x	
Basics of IoT security					x		x	x	x				x		
Performance analysis of IoT systems					x		x	x						x	x
Real-time IoT system design						x		x					x		

Learning Method /ILOs Matrix

Learning Methods	Knowledge and understanding						Intellectual skills				Professional and practical skills		General			
	a1	a2	a3	a4	a5	a6	b9	b11	b14	b20	c1	c2	d1	d2	d3	d4
Lectures	x	x	x			x	x	x			x	x	x	x	x	x
Tutorial Exercises							x	x			x	x				
Practical Lab							x	x			x	x		x	x	x
Discussions.							x	x				x	x	x	x	x

Assessment Methods /ILOs Matrix

Assessment Methods	Knowledge & understanding						Intellectual skills			Professional & practical skills		General			
	a1	a2	a3	a5	a5	a6	b1	b2	b3	c1	c2	d1	d2	d3	d4
Mid Term Exam	x	x	x	x	x	x	x	x	x	x	x				x
Final Exam	x	x	x	x	x	x	x	x							
Course Work & Quizzes	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Practical Exam	x	x	x	x	x	x	x	x	x	x	x		x		x

Course ILOs Vs Program ILOs

Course ILOs \ Prog ILOs		Knowledge & understanding				Intellectual skills				Professional and practical skills		General	
		A9	A10	A17	A19	B9	B11	B14	B20	C3	C4	D3	D12
Knowledge and Understanding	a1	x	x	x									
	a2		x										
	a3		x		x								
	a4												
	a5	x	x										
	a6	x	x										
Intellectual skills	b1					x							
	b2					x		x					
	b3					x		x					
Professional and practical skills	c1									x	x		
	c2									x	x		
General skills	d1											x	x
	d2											x	x
	d3											x	x
	d4											x	x

Course Coordinator : ()

Head of Department : Dr. Ahmed El-Abbassy ()

Date: --/--/2023