Course Name: Internet of Things **Course Code: ITEC456**

General Information						
Course Code	**ITEC456**	**Level/Year**	**8/4**	**Required (R) / Selected Elective (SE)**		**R**
Credit Hours	**Theory**	**2**	**Lab**	**1**	**Total**	**3**
Prerequisites	**ITEC353**	**Course Coordinator**		**Mohd Sarfaraz**		
Corequisites	**NIL**	**Track Leader**		**Dr. Ali Tahir**		

Course Description

This course aims at preparing students to the IoT market in Saudi Arabia, given the increasing demand for engineers on this hot emerging area. The course presents the latest technologies, architecture, communication protocols and trends that are contributing to the evolution of the Internet-of-Things (IoT). It will provide an overview of IoT applications and its impact on the world economy. The course will also cover the technologies and cyber-physical platforms that transform the physical world into digital data thus allowing to connect physical things to the Internet. It also covers networking and communication protocols that represent the major actors in the IoT ecosystem and the IoT streaming applications used in IoT. Additionally, the security requirements for creating IoT-based solutions alongside ethical, and legal challenges are discussed in this course. A major part of the course will deal with developing real-world applications prototypes for the Internet-of-Things from the sensor design to the end-user applications to solve existing problems in the society.

Course Objectives : On completion of the course, the student will be able to:

- Understand the IoT systems, techniques, applications and IoT Evolution.
- Identify the IoT devices (sensors and actuators, etc.), and security requirements for creating IoT-based solutions.
- Explain the architecture of WSN for different paradigms and describe the various IoT Topologies.
- Recognize the technologies associated with IoT connectivity, and ethical and legal challenges related to IoT.
- Determine appropriate communication protocol for their IoT implementation in real-world solutions.
- Discuss the new paradigms, challenges, and the future of IoT.
- Design IoT-based framework in real-world context and situation.
- Commit to work independently and collaboratively in a small group.

Course Contents

List of Topics	Weeks
CH 1: Emergence of IoT & Its Evolution	1,2,3
CH 2: IoT Sensing and Actuation	4, 5
CH 3: Wireless Sensor Network & IoT Processing Topologies	6, 7, 8
CH 4: IoT Connectivity Technologies	8, 9, 10
CH 5: IoT Communication Technologies	11, 12, 13
CH 6: Paradigm, Challenges & Future of IoT	14, 15

Textbook

- Introduction to IoT, by Sudip Misra, Anandarup Mukherjee, Arijit Roy ISBN: 9781108842952, Year 2021, Publisher : Cambridge University Press.
- Vlasios et al., Internet of Things: Technologies and Applications for a New Age of Intelligence, 2nd Edition, 2018. ISBN-9780128144367, Publisher: Academic Press.

Reference Materials

- Peter Waher, Learning Internet of Things, Packt Publications, ISBN:9781783553532, Year, 2015
- Gaston C. Hillar, Internet of Things with python, Packt Publications, ISBN: 9781785881381, Year 2016.

Course Learning Outcomes

CLO	Description	Mapped PI
CLO#01	**Define** IoT systems, their evolution, IoT networking components, and applications of IoT.	PI 1.1
CLO#02	**Explain** IoT devices, classification and types of sensors, and actuators.	PI 1.2
CLO#03	**Identify** the architecture of wireless sensor networks (WSNs) for various IoT paradigms, IoT processing topologies and their types.	PI 1.3
CLO#04	**Compare** the technologies related to IoT connectivity, suitable communication protocols, emerging paradigms, and the challenges faced by IoT.	PI 2.2
CLO#05	**Design** and develop secure IoT systems by selecting the appropriate hardware, software tools, and security requirements.	PI 2.1 PI 6.1 PI 6.2
CLO#06	**Implement** an IoT framework in real-world scenarios, document and present the results to stakeholders.	PI 2.3 PI 3.1 PI 3.2

CLO-PI-SO Mapping

	SO-1	SO-2	SO-3	SO-4	SO-5	SO-6
CLO#01	PI 1.1	-	-	-	-	-
CLO#02	PI 1.2	-	-	-	-	-
CLO#03	PI 1.3	-	-	-	-	-
CLO#04	-	PI 2.2	-	-	-	-
CLO#05	-	PI 2.1		-	-	PI 6.1 PI 6.2
CLO#06	-	PI 2.3	PI 3.2 PI 3.3	-	-	