INGEGNERIA INFORMATICA (LM75)

(Lecce - Università degli Studi)

Insegnamento INTERNET DELLE COSE

GenCod A006802

Docente titolare Luigi PATRONO

Insegnamento INTERNET DELLE COSE

Insegnamento in inglese INTERNET OF THINGS

Settore disciplinare ING-INF/05

Corso di studi di riferimento INGEGNERIA INFORMATICA

Tipo corso di studi Laurea Magistrale

Crediti 9.0

Ripartizione oraria Ore Attività frontale: 81.0

Per immatricolati nel 2022/2023

Erogato nel 2022/2023

Anno di corso 1

Lingua ITALIANO

Percorso PERCORSO COMUNE

Sede Lecce

Periodo Secondo Semestre

Tipo esame Orale

Valutazione Voto Finale

Orario dell'insegnamento https://easyroom.unisalento.it/Orario

BREVE DESCRIZIONE DEL CORSO

+ Description of the course
+ Introduction to Internet of Things and Web of Things
+ Introduction to WoT through use cases and practical approach
+ Introduction to Typescript and Node.js applications
+ WoT stack
+ RFID technology and Traceability
+ Bluetooth Low Energy and its evolution
+ Wireless Sensor Networks: IEEE 802.15.4, 6LowPAN, RPL, IPv6
+ Embedded Systems: Raspberry Pi, MT3620 and STM32
+ Layer 1 of the WoT stack: Access Layer
+ REST, CoAP, MQTT
+ Layer 2 of the WoT stack: Find Layer
+ Layer 3 of the WoT stack: Share Layer
+ Security in IoT and WoT, Blockchain, IOTA and Algorand
+ Layer 4 of the WoT stack: Compose Layer (Physical Mashup)
+ Introduction to Cloud Computing and Edge/Fog Computing
+ Introduction to AI applied to IoT
+ Domotics: KNX standard and practical use cases
+ Discussion of several use cases regarding smart environments

PREREQUISITI

+ COMPUTER NETWORKS
+ SOFTWARE ENGINEERING
+ PROGRAMMING LANGUAGES (C, Java)

OBIETTIVI FORMATIVI	The Internet of Things course aims to offer a complete vision on how to design and develop smart objects and smart services based on hardware and software technologies enabling the Internet of Things. Particular attention will be paid to the creation and testing of the so-called smart environments. The Web of Things approach will be adopted which allows a total abstraction from the main physical technologies adopted in modern networks. The extended WoT protocol stack, composed of four layers, will be discussed, details on emerging enabling technologies such as RFID, embedded systems, WSN and Bluetooth Low Energy (BLE) will be provided. The REST architectural style and protocols such as CoAP and MQTT will be described. Several practical use cases focused on building smart environments will be discussed.
METODI DIDATTICI	Teaching methodology adopted in the Internet of Things course is based both on theoretical discussion on emerging technologies enabling the IoT and practical discussion of use cases about the design and developing of smart environments. Furthermore, several external seminars focused on specific topics of the IoT will be organized involving important industrial companies.
MODALITA' D'ESAME	Discussion of a practical project or a research topic in the IoT field and oral exam on all topics analyzed in the course.
ALTRE INFORMAZIONI UTILI	All didactic materials (slides, scientific papers, etc..) are available in the elearning repository of Unisalento: (https://elearning.unisalento.it/course/view.php?id=911).
PROGRAMMA ESTESO	+ Description of the course + Introduction to Internet of Things and Web of Things + Introduction to WoT through use cases and practical approach + Introduction to Typescript and Node.js applications + WoT stack + RFID technology and Traceability + Bluetooth Low Energy and its evolution + Wireless Sensor Networks: IEEE 802.15.4, 6LowPAN, RPL, IPv6 + Embedded Systems: Raspberry Pi, MT3620 and STM32 + Layer 1 of the WoT stack: Access Layer + REST, CoAP, MQTT + Layer 2 of the WoT stack: Find Layer + Layer 3 of the WoT stack: Share Layer + Security in IoT and WoT, Blockchain and IOTA + Layer 4 of the WoT stack: Compose Layer (Physical Mashup) + Introduction to Cloud Computing and Edge/Fog Computing + Introduction to AI applied to IoT + Domotics: KNX standard and practical use cases + Discussion of several use cases regarding smart environments

TESTI DI RIFERIMENTO	+ Building the Web of Things: With Examples in Node.js and Raspberry Pi. Dominique D. Guinard, Vlad M. Trifa + Internet of Things for Architects: Architecting IoT solutions by implementing sensors, communication infrastructure, edge computing, analytics, and security. Perry Lea + Scientific papers + Web links