UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Ingegneria
ACADEMIC YEAR	2021/2022
SECOND CYCLE (7TH LEVEL) COURSE	ELECTRONICS ENGINEERING
INTEGRATED COURSE	ELECTRONICS AND IOT FOR BIOMEDICAL APPLICATIONS - INTEGRATED COURSE
CODE	20251
MODULES	Yes
NUMBER OF MODULES	2
SCIENTIFIC SECTOR(S)	ING-INF/01, ING-INF/03
HEAD PROFESSOR(S)	TINNIRELLO ILENIA Professore Ordinario Univ. di PALERMO
OTHER PROFESSOR(S)	TINNIRELLO ILENIA Professore Ordinario Univ. di PALERMO
CREDITS	12
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	2
TERM (SEMESTER)	1° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**TINNIRELLO ILENIA** Monday 9:00 12:00 Ufficio del docente, presso il DEIM, secondo piano.

MODULE
PERSONAL AREA NETWORK

Prof.ssa ILENIA TINNIRELLO

SUGGESTED BIBLIOGRAPHY

Matthew Gast, "Wireless Networks: The Definitive Guide", O'Reilly, ISBN: 9780596100520
Jamil Y. Khan, Mehmet R. Yuce - "Internet of Things (IoT): Systems and Applications", 2019, ISBN 9789814800297

AMBIT	20925-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	102
COURSE ACTIVITY (Hrs)	48

EDUCATIONAL OBJECTIVES OF THE MODULE

The focus of this course is to explore the basic building blocks that make the Internet of Things possible, including the underlying core hardware components, basic input/output operations, wireless radio technologies, and sensing/actuation devices. We will discuss fundamental concepts of IoT systems and their usage in a wide range of applications.The course also incluso various lab modules and projects, for integrating various IoT components, such as sensing, actuation, and networking (using Raspberry Pi and Arduino devices).

SYLLABUS

Hrs	Frontal teaching
2	Radio channel characterization. Propagation and fading models.
2	Introduction to modulations, channel capacity and models.
4	Short/medium range wireless technologies. 802.11 technology: network architectures, infrastructure and ad-hoc modes, addressing. Physical layers and Medium Access Control Layer (DCF and PCF).
6	Short-range wireless technologies: 802.15.1 and 802.15.4 standards.
6	Long-range communication technologies: LoRaWAN and NB-IoT.
6	IP Network protocols and adaptations for sensor networks; ad-hoc routing protocols.
4	IoT Session Layer protocols: MQTT and CoAP
6	IoT Boards for Prototyping.
2	Introduction to IoT clouds and analytics.

Hrs	Practice
10	Examples of IoT node integrazions and case studies.