TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA

Laboratorio di Elettromagnetismo Pervasivo

prof. Gaetano Marrocco
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Corso di
Sistemi Wearable e Telemetria Medica
Prof. G. Marrocco
A.A. 2024-25

Ciclo di lezioni su:

Research, development and approval of wearable & implantable wireless medical devices

Ing. Fabio URBANI – Medtronics US

This course is developed to address technical skills gap currently present in the medical device industry and is designed for young engineers and scientists interested in research and development of wearable and implantable wireless medical devices. The course focuses on the RF channel design and characterization to meet ecosystem and use case requirements.
Course topics provide best practices and industry-based standard operating procedures to design, characterize and launch wireless medical devices. Each topic will be supported by real hands-on examples.

Scientist, innovative thinker and achiever Sr. Pr. RF/Wireless engineer/scientist with 20+ years experience in RF/microwave and telecommunication sectors and 10+ years managerial experience. Advanced understanding of standard-based and custom RF/microwave design methodologies, communication protocols, and prototype verification. Expertise with state-of-the-art test equipment and software tools to validate systems and prepare technical documentation. Great overall understanding of standard reliability and maintenance techniques.

https://www.linkedin.com/in/fabio-u-9958b26/

Date delle lezioni:
8 maggio, 15 maggio, 22 maggio, 23 maggio
Ore 16:00 – 18:00
Le lezioni saranno tenute **in modalità telematica** su TEAMS

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Programma

New product definition
In-/On-/Off-body wireless personal area network communication. Voice-Of-Customers (VOC), Voice-Of-Business (VOB) and Voice-Of-Technology (VOT). Ecosystem, use cases, form factor and cost definition. System, product and hardware requirement definition.

Design for Reliability and Manufacturability
Framework of best practices that optimizes effectiveness and efficiency of product development through predictive engineering. One of its objectives is to quantitatively characterize effect of use condition variation on the design's ability to optimally meet system requirements that flows from user needs and Voice of Customer (VOC).

Design for EMC/ESD
EMC and ESD mitigation using EDA simulation tools. RF coexistence.

Design characterization, verification and qualification
Link budget/margin and wireless performance predictions using IEEE-based models and full wave analysis tools. RF channel in the presence of human body. RF PHY/Link layer analysis. Prototype design & manufacturing. Design of verification and qualification procedures and tools. Pre-compliance tests.

Design of ATE for manufacturing
PCBA and device level tester architecture (including best equipment identification), design and deployment. RF environment design, simulation and measurement. Calibration procedure. Tester limits and product specifications traceability.

Product approval for heavily regulated markets
Design of RF compliance and qualification procedures and tools for product approval submission to regulatory bodies such as FCC, ETSI, FDA, GMED, AIFA, etc.