DRIEI
PhD Program in Electronic and Computer Engineering
University of Cagliari, Italy

Course:	Smart Building
Instructor:	Francesca Marcello
SSD:	ING-INF/03 TELECOMMUNICATIONS
Credits / hours:	2.5 credits / 20 h
Language:	English
Scheduling:	June-July, yearly
Final Exam:	Written
Website:	https://sites.unica.it/net4u/smart-building/

Goal of the Course

Smart buildings are becoming increasingly popular as more people recognize the benefits they offer. They optimize energy consumption, reduce waste, and lower operational costs through advanced technologies like automation, sensors, and data analytics. By intelligently managing systems such as lighting, Heating, Ventilation and Air Conditioning (HVAC), and security, smart buildings enhance energy efficiency, comfort, and occupant quality of life. They contribute to sustainability efforts, reduce carbon footprint, and align with global initiatives to combat climate change, especially considering that the building sector is responsible for approximately 40% of the global energy consumption. Moreover, smart buildings enable organizations to future-proof their infrastructure, enhance operational efficiency, and meet the growing demand for intelligent and sustainable building solutions in a rapidly evolving world.

By understanding the principles and strategies behind smart buildings, this course will guide the students through the main enabling technologies such as the Internet of Things (IoT) and data analytics, fostering innovation in the field. Furthermore, through interactive sessions, the course will equip the students with insights into future trends like dynamic digital representations of buildings, personalized building control and emotionally intelligent buildings.

Requirements

There is no particular background required by the students to attend the Smart Building course.

Intersection with other courses at the University of Cagliari

There is partial intersection with the course “Smart Housing” in the Master’s Degree in Internet Engineering. For students who have already completed this course, the assigned credit will be 1 instead of 2.5.

Course Outline

1. Introduction to the course and to the main concepts related to Smart Buildings (2 hours).
2. The System Development Life Cycle (SDLC) of a Building Automation System (BAS)-Planning, analysis, design, and implementation (6 hours).
3. Smart Homes (3 hours).
4. Smart Workplaces (3 hours).
5. Other Smart Buildings (3 hours).
6. Hands on Arduino - How to implement a simple BAS system (3 hours).