**Networked Embedded Systems (9 CFU)**

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**OBJECTIVES.** This course is intended to provide the theoretical background and the basic methodologies for developing networked embedded systems and applications. It enables students to design and implement applications, based on networked embedded devices and pervasive computing, in several application domains, including smart buildings, smart cities, smart grid, e-health, etc.

**TENTATIVE PROGRAM**


**SENSOR NODES.** Sensors: passive, semi-passive, and active sensors. Sensor nodes. Hardware architecture. Operating systems for sensor nodes. Sensor platforms (6 hours)


**MIDDLEWARE.** Programming models: declarative, task-oriented and agent-oriented programming. Dynamic re-programming of wireless sensor networks. Cloud architectures for participatory sensing (10 hours)

**DATA MINING:** Signal pre-processing, feature extraction, feature selection, classification models, performance evaluation. Sensor fusion. (12 hours).

**CONTEXT-AWARENESS.** Context. Context representation. Context detection. Context-aware applications (6 hours)

**APPLICATIONS.** Sensor/WSN based applications for smart buildings (home/building automation, energy efficiency), smart cities (pollution monitoring, parking area management, context-aware applications), e-health (fall detection). (16 hours)

**REFERENCES**

- Papers provided by instructors

**ASSESSMENT**

- oral examination + project discussion (design and implementation of a pervasive computing application, based on wireless sensors or sensor networks).