Course: Data Centric Architectures — credits: 5

Course code	SEVM19DCA
Name	Data Centric Architectures
Study year	2026-2027
ECTS credits	5
Language	English
Coordinator	M. Sedighi
Modes of delivery	Lecture Project-based learning
Assessments	Data Centric Architectures - Assignment

Learning outcomes

At the end of this module the student is able to:

- design and/or implement a Digital Signal Processing Architecture considering fixed point core, floating point core, PLD, FPGA, GPU and mixed signal systems.
- implement algorithms by means of the most suitable programming model (i.e., sequential/linear, functional, parallel).
- design an IoT system considering edge, fog, cloud or mist computing IoT architectures.
- design IoT system connectivity considering wireless and wired communication technologies, such as for example: Wifi, mobile G4/G5, LoRa, ethernet, etc.
- evaluate the impact of system design choices on resource usage considering at least energy consumption and usage of rare materials.

Content

The course covers the following topics:
The student is trained in architectural design at two conceptual levels. At the level of System Architectures for “big data” applications they learn about top-level trade-offs, e.g. between measured data rates and required processing power.
The student get introduced to high-performance computing and streaming database technology. At the level of Digital Signal Processing Architectures, the student learns key concepts (fixed point, floating point) and technologies (FPGA, GPU, Mixed signal chips).
Linear and Functional programming as well as Parallel processing are covered.

Included in programme(s)

Smart Systems Engineering

School(s)

Engineering, Life Sciences & ICT

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