

PT-project SAN-Labs

Towards Smart building 5 with LoRa

This year we combine the Labs to a mix of a project + 2 labs. The project will cover the topic of LoRa technology by building LoRa-based sensors (or actuators) for different applications in/around building 05.

Experiments 1 and 2: Discuss ideas with students and the list of materials.

- Start with the documentation of the prototype.
- Dates: Week 41, **Week 43, Pitch deadlines**, Raw schematics
- Milestones/Deadlines: bill of materials till **23.10.2025 No parts after that date.**

3D-case – rough estimation of PLA material

Experiments 3 and 4: Two of the four lab experiments.

- While we order the necessary components, the students will perform 2 mandatory lab experiments, you can choose freely which 2 out of a pool of 4 labs you will perform.
- Labs: Strain Gauge, Actuators, Energy Harvesting, CAN-bus.
- Timeline: Week 45, Week 47.
- Deadlines for the registration for the Labs: 23.10.2025

Experiments 5 and 6: Build, implement, test.

- During these 2 weeks the students will build and /or implement the components into a working prototype, prepare documentation of the prototype including schematics, code etc.
- Timeline: Week 49, Week 51 .
- Milestones/Deadlines: Documentation uploaded to moodle till 05.01.2026.

3D-case files- 2 weeks after receiving the parts.

Experiment 7: Presentation. Timeline: Week 2, Week 3 of 2026.

Presentation has to show the development of your idea: Why this topic, main thoughts and concepts, materials, building progress, describe problems that have arisen while implementing and developing the task. Details to your specific solution of the problems. A demonstration is desirable.

Requirements: If your prototype will be an outside placed sensor it needs to be solar-powered. The prototype needs to last at least a year (optimal up to 3 years). Sufficiently documented for repairs or further improvements in the near future (e.g. integration into thesis). Budget up to 100 € / group.

Work in groups of up to 3 persons.

What will be graded:

- Meeting the deadlines (e.g. bill of materials),
- Pitch presentation (up to **3** points),
- The two out of the four labs of choice (up to **4** points/Lab, in sum 8)
- Documentation incl. code (up to **4** points)
- Presentation and demonstration (up to **15** points)

Total **30** Points for the set of Labs/project, which will account for 30 % of the final grade.

Exam will be 70 % of the final grade.