Course Title :	**Detector Physics**
Number of hours/semester :	30 h, 1st Semester
Number of ECTS :	3
Lecture outline, contents :	The detectors used in nuclear physics and accelerator-based particle physics, in the field of astroparticles, or even in cosmology are of different natures but they must meet the same requirement: to enable the desired quantity to be evaluated with the best sensitivity and resolution. Modern experiments often employ numerous sub-detectors using different and complementary techniques to measure energies, directions or to identify particles. The teaching unit "Physics of Detectors" of the M2 NPAC gives a complete overview of these different techniques. Since the detection of particles is related to how they interact, the unit deals in detail with the interaction of neutral or charged particles in matter, focusing on application rather than theory. The basic concepts of how detectors work are discussed: triggering, dead time, quenching, etc. Finally, based on numerous examples, the different types of detectors used in current experiments are reviewed: gas detectors, solid-state detectors, scintillators, bolometers, etc. This teaching unit complements the "Laboratory Work", carried out at the same time, where students implement some of the detectors discussed during the course.
Pedagogical methods :	Lectures and Tutorials + Short work in a research team (article analysis)
Prerequisites :	Some basic knowledge in particle physics, nuclear physics, semi-conductors, solid-state physics would help, but is not mandatory.
Modalities of knowledge assessment :	Written examination and oral presentation of the research on articles about detectors or detector technologies.
Bibliography :	1. Radiation Detection and Measurement/ Knoll 2. Techniques for Nuclear and Particle Physics Experiments: A How-to Approach/ Leo