Piezoelectric materials, properties and devices

Summary
The students acquire knowledge on structure-property relations of piezoelectric and related materials (ferroelectrics, relaxors). Different material classes (ceramics, crystals, composites, polymers) are discussed in view of applications in sensors, actuators, high frequency transducers and others.

Content
Since the background and interest of the attendees varies from year to year, the lectures' content is adapted each time to the participants as much as this is possible. The discussed topics may include but are not limited to:
5. Piezoelectric resonance.
6. Equivalent circuits.
7. Physical phenomena that can contribute to the piezoelectric effect. Piezoelectric hysteresis, nonlinearity, creep and relaxation.
8. Piezoelectric actuators and motors.
11. Surface acoustic wave effect and devices.
12. Other types of electro-mechanical and magneto-electro-mechanical coupling (electrostriction, flexoelectricity, strain mediated magneto-electric effect)

Note
Maximum number of participants: 30

Keywords
Piezoelectric effect, piezoelectric materials, actuators, sensors, crystals, ceramics, transducers power transducers, surface acoustic wave effect

Learning Prerequisites
Recommended courses
physics and mathematics on the bachelor level of EPFL, basic materials science
Resources

Websites

- lc.epfl.ch/ddamjanovic.html