Summary
Presentation of the electro-weak and strong interaction theories that constitute the Standard Model of particles. The course also discusses the new theories proposed to solve the problems of the Standard Model.

Content
Partons and quarks:
Deep inelastic scattering. Annihilation e+e- at LEP, jets and strings.

Weak Interaction:
Fermi’s V-A theory. Pion and muon decays. Cabibbo's theory. The W and Z bosons and their observation at the CERN collider.

Model of quarks and QCD:
SU(3) flavour, mesonic and baryonic structure. SU(N). Quarkonium. The Colour.

Gauge Theories and the Standard Model:
Global and local gauge invariance. Yang and Mills theories. Spontaneous symmetry breaking. Electro-weak theory SU(2)xU(1), the Higgs mechanism. GUTs, the Grand Unification.

Learning Prerequisites
Recommended courses
Nuclear and Particle Physics I and II, Quantum mechanics I and II

Learning Outcomes
By the end of the course, the student must be able to:
• Analyze the sub-microscopical physical phenomena

Teaching methods
Ex cathedra and exercises in class

Assessment methods
oral exam (100%)

Resources
Websites
• http://lphe.epfl.ch/~bay