Course Title: Electromagnetic Fields	**Number of units:** 1
SSD: ING-INF/02	**CFU:** 6
Course aims: The course introduces Engineering and Mathematical Engineering paradigms to support comprehension and exploitation of Electromagnetic Fields. Theory, techniques, methods, algorithms and engineering applications are presented.	
Course Description: Engineering and Electromagnetic Fields. Maxwell's equations in integral and differential form, the inductive approach, physics as semantic for electromagnetic fields, energy and electromagnetic fields. Deductive approach, mathematics as syntax of electromagnetic fields, from Maxwell equations to the theorems, validity limits and meanings. Engineering and representations of electromagnetic fields in the various domains: time, phasor, frequency and wave number domain. Constitutive relations: models, formulation and meaning. Canonical solutions for the various domains. Source free solutions: propagation. Solutions in the presence of sources: Green's method, radiation. Role of initial conditions, integral-differential formulations and their solution. Role of the boundary conditions; geometry and symmetry (planar, circular, spherical) for canonical problems in electromagnetic fields. Applications and techniques: cavity, waveguides, transmission lines. Ideal and actual boundary conditions: perturbative approaches to solutions. Engineering parameters and paradigms for propagation. Engineering parameters and paradigms for radiation. Deterministic and stochastic approaches to the solution of electromagnetic field problems in engineering. Approximate solutions to the propagation and radiation. Asymptotic and series expansion solutions: method, validity, meaning, applications. Solutions in engineering of electromagnetic field problems: methods, validity, reliability.	
Assessment methods: Oral interview and discussion	