



Title:	<i>Photonics: theory and computational methods</i>
Lecturers:	L. Andreani
Duration:	25h
CFU:	4
Period:	20th January – 29th February 2024
Content:	<p>The course deals with various theoretical aspects of nano-photonics in dielectric and metallic metamaterials.</p> <p>The contents consist of three main topics:</p> <ol style="list-style-type: none">1. Basics: Photonic crystals, 1D 2D 3D, waveguides and nanocavities, control of spontaneous emission (Purcell effect).2. Computational methods: guided-mode expansion (GME), rigorous coupled wave analysis (RCWA), finite-difference time domain (FDTD), Bloch-mode expansion + scattering matrix (EMUstack).3. Advanced topics: Bound states in a continuum, topological photonics, quasi-normal modes, inverse design methods. <p>The exact contents and balance of the three topics can depend on the interests of the students and will be decided accordingly.</p> <p>Teaching methods: normal lectures + numerical hands-on for the computational methods.</p>
Notes	Oral, exam students will be asked to give a seminar on a selected topic.