Tentative distribution of topics over lectures

- A Photonics / integrated optics, theory: Maxwell equations; dielectric waveguides & circuits: phenomena, introductory examples.
- B Brush up on mathematical tools: vector calculus, Fourier transform, differential equations, linear problems with homogeneity along a coordinate, a little variational calculus.
- C Maxwell equations, survey of different formulations, time and frequency domain, interfaces, energy and power flow, material properties, dispersion.
- D Classes of simulation tasks: scattering problems, time and frequency domain, mode analysis, resonance problems; spatial dimensions / symmetry; scalar, quasi-vectorial approximations; initial value problems (beam propagation method, brief); boundary conditions (brief).
- E Normal modes of dielectric optical waveguides: governing equations, symmetry properties, polarization, classification, orthogonality, completeness properties; mode superpositions: power evaluation; (super-) mode interference.
- F Examples for dielectric optical waveguides: multilayer slab waveguides, channel waveguides of rib- or strip-type (effective index model), optical fibers, complex waveguides (loss/gain, leakage).
- G Waveguide discontinuities (BEP/QUEP simulations, brief), examples, scattering matrices, reciprocal circuits.
- H Bent optical waveguides: general, 2D, examples, field displacement, radiation losses; whispering gallery resonances; circular integrated optical microresonators.
- I Conventional (codirectional) coupled mode theory, parallel optical channels: parametrized models, derivation of CMT equations by means of reciprocity techniques / from a variational principle; perturbation theory for optical waveguides.
- J A touch of photonic crystals; a touch of plasmonics.
- Hybrid analytical / numerical coupled mode theory.
- Oblique semi-guided waves: 2-D integrated optics.

Note that, depending of the progress of the course, the contents are likely to change.