UNIVERSITÀ
DI PAVIA

Ph.D. Program in Electronics, Computer Science and Electrical Engineering

COURSE

Numerical Methods for the Design of Photonic and Microwave Components

Profs. M. Bozzi, N. Delmonte, C. Lacava, and A. Agnesi

OBJECTIVES: The purpose of the course is to provide students with numerical skills for the design of photonic and microwave devices and components in the guided propagation regime or in free space. The course also includes presentation and in-depth study of the main software adopted in scientific and commercial applications.

PROGRAM

- Finite Difference Time Domain (FDTD) method
- Method of Moments (MoM)
- Finite Element Method (FEM)
- Design of microwave components by using FEM commercial software
- Beam propagation in free space: Gaussian beams
- ABCD matrices with examples
- Linear and nonlinear beam propagation with FFT methods
- Design of photonic components using 3D FDTD commercial software
- Design of resonant components using 2.5D FDTD and FEM commercial software with examples

EVALUATION: Each student will give a short presentation of a small project or a topic presented during the course.

ATTENDANCE: The lectures will be delivered in presence (room TBD). Students who are not currently in Pavia can contact the course instructors to receive a Zoom link.

LECTURES: 33 hours; CREDITS: 6.6 ECTS

DATES: 9, 16, 23 Nov. 2026, h. 16-19, Seminar Room Blue. Following dates TBD.

Ph.D. Coordinator
Prof. Ilaria Cristiani

Seminar in English
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