Summary
This course will give an introduction to some aspects of nonlinear dispersive partial differential equations. These are time evolution problems that arise in many contexts in physics, such as quantum mechanics, electrodynamics, fluid motion and relativity.

Content
The course is aimed to be self-contained, introducing the necessary technical tools along the way.
1. Introduction. What are dispersive equations? How do they arise?
2. Technical Background: Fourier Analysis & Sobolev Spaces
3. Linear Dispersive Equations
4. Semilinear Equations
4.1 Local Theory
4.2 Criticality and Scaling
4.3 Global Theory
4.4 Advanced Topics / More Technical Background
5. Quasilinear Equations
5.1 Method of Spacetime Resonances
5.2 Advanced Topics

Learning Prerequisites
Required courses
A solid foundation in analysis (including measure theory and functional analysis) is necessary. Advanced topics such as harmonic analysis would be helpful, but are by no means required.

Assessment methods
Active participation in the exercise sessions
Oral final examination
Dans le cas de l’art. 3 al. 5 du Règlement de section, l’enseignant décide de la forme de l’examen qu’il communique aux étudiants concernés.