

## 1 Course

**Math 664-600, TR 2:20 - 3:35, Bloc 160**  
**Periodic ordinary and partial differential**  
**equations and their applications**

## 2 Instructor

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## 3 Course Description:

ODEs and PDEs with periodic coefficients have been arising in mathematics and its various applications (mechanics, fluid mechanics, solid state physics, material science, nano-materials, optics, etc.) for many years. The main components of the theory of such ODEs were developed in the first half of 20th century, while another significant outburst of the progress happened in 1970s, after the explosion of the exactly integrable systems theory. The even more important (and much harder) PDE counterpart has been being developed through the last decades, and many parts of the theory are not done yet. The most comprehensive current sources available are the instructor's survey in the Bulletin of the AMS in July 2016 and a much more expanded book by him in preparation.

The course will introduce the main notions, results, and approaches both for the ODE and PDE situations. In particular, relations to stability of periodic motions, spectral theory, and solid state physics will be described.

## 4 The recommended prerequisites

Basic knowledge of ODEs and PDEs, Fourier transform, as well as of real, complex, and functional analysis (or the instructor's consent).

## 5 Tedxtbook

No textbook is required, lecture notes will be distributed.