

Course title:

Stochastic Partial Differential Equations

Duration [number of hours]: **24**

PhD Program [MERC/MPHS/SPACE]: **MPHS**

Name and Contact details of unit organizer(s):

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Course Description [max 150 words]:

This course is meant to be a basic introduction to SPDEs. An introduction to the main features of the involved stochastic processes and random fields will be presented before going deeper into the setting of stochastic partial differential equations. We will mainly focus, for technical reasons that will be clearer throughout the lectures, on the parabolic setting with cylindrical noise. Nevertheless, other SPDEs of hyperbolic and elliptic type will be discussed, if time allows us to do so.

Syllabus [itemized list of course topics]:

- Random fields
- Infinite-dimensional Wiener processes and cylindrical Wiener processes
- Linear Parabolic SPDEs
- Stochastic Porous Media Equation
- Random Distributions
- Boundary Conditions for SPDEs

Assessment [form of assessment, e.g., final written/oral exam, solutions of problems during the course, final project to be handed-in, etc.]:

As a final assessment, students will either explore one of the topics of the course or will discuss about a further topic related to them, that has not been discussed in detail throughout the course.

Suggested reading and online resources:

Notes: Notes will be (hopefully) released after each lecture

Suggested books:

1. Lotovsky & Rozovsky: Stochastic Partial Differential Equations
2. Liu & Rockner: Stochastic Partial Differential Equations: An Introduction
3. Prevot & Rockner: A Coincise Course on Stochastic Partial Differential Equations
4. Rozanov: Random Fields and Stochastic Partial Differential Equations