

Program

[Functional analysis](#)

[Ordinary differential equations](#)

[Practical resolution of differential systems](#)

[Schedule](#)



There are three courses in the school including Functional analysis, Ordinary differential equations and Practical resolution of differential equations.

The lecture notes will be daily updated. The information of courses including lecturers are as the following.

LIST OF COURSES

1. FUNCTIONAL ANALYSIS

by Joaquim Correia, University of Évora, Portugal

In this course, we present the main results of functional analysis essential to the study and resolution of differential equations. This course is composed of:

- i.- Hilbert spaces
- ii.- Theorems of Stampacchia and Lax-Milgram
- iii.- Variational formulation and Sobolev spaces

2. ORDINARY DIFFERENTIAL EQUATIONS: THEORY and NUMERICS

by Youcef Mammeri, University of Picardie

This lecture deals with the classical tools to study ordinary differential equations. It contains the following topics:

- i.- Notion of solutions, fundamental solution, Duhamel's formula
- ii.- Existence and uniqueness, local and global solution
- iii.- Qualitative properties, stability
- iv.- Finite difference schemes, one-step methods
- v.- Stiff problem
- vi.- Multi-step methods.

3. PRACTICAL RESOLUTION OF DIFFERENTIAL SYSTEMS

by Marília Pires, University of Évora, Portugal

This practice presents the main features of a free software to solve mathematical equations derived from concrete problems:

- i.- Presentation of Scilab (or python)
- ii.- Basics (number, characters, function)
- iii.- Graphics
- iv.- Linear and nonlinear systems
- v.- Differential equations

SCHEDULE

Day Time	Thursday 12/22	Friday 12/23
8:00-8:30	Opening	
8:30-10:30	Correia	Correia
10:30-11:00	break	break
11:00-12:30	Correia	Correia
12:30-14:00	lunch	lunch
14:00-16:00	Correia	Correia
16:00-17:30	group discussions	group discussions

Day Time	Monday 12/26	Tuesday 12/27	Wednesday 12/28	Thursday 12/29	Friday 12/30
8:30-10:30	Correia / Mammeri	Mammeri	Mammeri	Pires	Pires
10:30-11:00	break	break	break	break	break
11:00-12:30	Mammeri	Mammeri	Pires	Pires	Pires
12:30-14:00	lunch	lunch	lunch	lunch	lunch
14:00-16:00	Mammeri	Mammeri	Pires	Pires	closing
16:00-17:30	group discussions	group discussions	group discussions	group discussions	