

Course Name	Code	Local Credits	ECTS
<i>Modelling with PDE's</i>			

Academic Institution offering the course	Universidad San Jorge
Mode of Delivery (in class/online/blended)	Blended
Prerequisites by topic	R and the previous course of Modelling with ODE's
Language of Instruction	English
Level of Course Unit (1/2/3)	Level 3 (Advanced)
Course Coordinator	Jesús Carro
Course Lecturer(s)	Jesús Carro Marta Gómez Alejandro Alcaine
Course Objectives	To give a short introduction to different technologies widely used in the world of mathematics and engineering to solve, visualize, and communicate results.
Course Contents	<ol style="list-style-type: none"> 1. Partial differential equations 2. Second order PDE's 3. Elliptic PDE's 4. Parabolic PDE's 5. Solving PDE's in R
Learning Outcomes of the Course Unit	<ol style="list-style-type: none"> 1. Explain the mathematical models that can be described by Partial Differential Equations 2. Solve systems of partial differential equations with initial values or contour problem 3. Implement numerical solutions of partial differential equations.

DESCRIPTION

A partial differential equation is an equation in which some terms are the derivatives of a function with respect to different independent variables. These systems are very common. PDE models permit us to simulate bidimensional or tridimensional problems. In this course, we will analyze some bidimensional systems and some unidimensional systems that evolve with time.

WEEKLY SUBJECTS AND RELATED PREPARATION STUDIES

Week	Subjects
1	Partial differential equations
2	Second order PDE's
3	Elliptic PDE's
4	Parabolic PDE's
5	Solving PDE's in R
6	Final Practice

Date	Content	Link
26/11/2021 16:00	Activity 1: PDE's analytical solution	
2/12/2021 9:00	Activity 2: Solving Elliptic PDE's with R	
13/12/2021 12:40	Activity 3: Solving Parabolic PDE's with R	
20/12/2021 12:40	Activity 4: Final practice	

Recommended or Required Reading	VELTEN, Kai. Mathematical modeling and simulation. Introduction for Scientists and Engineers. Wiley, 2009. ISBN: 978-3-527-40758-8 INGALLS, Brian. Mathematical Modelling in Systems Biology: An Introduction. University of Waterloo
Other Course Resources	ATKINSON, Kendall E.; HAN, Weimin; STEWART, David. Numerical Solution of Ordinary Differential Equations. John Wiley & Sons, Inc, 2009. ISBN: 9781118164495 https://www.math.uwaterloo.ca/~bingalls/MMSB/