

Mathematical Models (MM)			
Code number:	75106	Number of ECTS:	6 ECTS
Semester:	Spring	Language:	English
Lecturer(s) and contact: Dr. César Gutiérrez Vaquero (cesargv@uva.es)			
Learning goals: At the end of this course, the student should be able to: - Apply mathematical theories and tools to translate some real-world phenomena into a proper scientific framework. - Build, analyse, evaluate, improve, and use basic mathematical models. - Apply appropriate numerical methods to solve basic mathematical models. - Interpret the results of modelling. - Communicate the entire modelling process.			
Contents: - A quick look. Examples from proportionality and geometric similarity. - Modeling change. Difference equations and systems of difference equations. - Experimental models. Fitting, smoothing, regression models and variance analysis. - Simulation modelling. Monte Carlo simulation. Applications to calculus and queuing models. - Optimization models. Modelling using linear, nonlinear and multiobjective programming. - Dynamic models. - Differential equations and systems of differential equations.			
Prerequisites: Although the necessary mathematical and scientific background will be developed as needed, the basics of Linear Algebra and Calculus are recommended.			
Assessment: Final exam (60%), Lab exercises and their discussion (30%) and attitude and contributions in regular in-training activities (10%).			