ETSIT
Escuela Técnica Superior de
Ingenieros de Telecomunicación

Mathematical Models (MM)			
Code number:	7xxxx	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:

1. A quick look.

   Examples from proportionality and geometric similarity.

2. Modeling change.

   Difference equations and systems of difference equations.

3. Experimental models.

   Fitting, smoothing, regression models and variance analysis.

4. Simulation modelling.

   Monte Carlo simulation. Applications to calculus and queuing models.

5. Optimization models.

   Modelling using linear, nonlinear and multiobjective programming.

6. Dynamic models.

7. 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%).