

Program	09TT- Engineering in Telecommunication Technologies and Services
----------------	---

Course number and name	
Number	95000093
Name	Numerical Analysis Lab Laboratorio de análisis numérico
Semester	Y3-S6

Credits and contact hours	
ECTS Credits	4.5
Contact hours	45

Coordinator's name	FRANCISCO JOSE NAVARRO VALERO
---------------------------	-------------------------------

Specific course information		
Description of course content		
The course is aimed at providing the students a background on the methodology of numerical analysis, presenting the main numerical techniques and applying these techniques to the solution of practical problems.		
List of topics to be covered		
Introduction to Matlab. Error analysis. Numerical solution of linear systems. Iterative methods for the solution of nonlinear systems Spline interpolation. Numerical integration. Numerical solution of ordinary differential equations. Numerical solution of partial differential equations.		
Prerequisites or co-requisites		
None, but it is assumed that the students have a background on calculus and linear algebra.		
Course category in the program		
<input type="checkbox"/> R (required)	<input type="checkbox"/> E (elective)	<input checked="" type="checkbox"/> SE (selective elective)

Specific goals for the course
Specific outcomes of instruction

RA1: Learning the basic tools for the approximate solution of mathematical problems lacking exact solution procedures.
 RA2: Estimating the various errors intervening in numerical methods (rounding error, discretization error, etc.).
 RA3: Learning the basic methods for solving linear and nonlinear systems of equations.
 RA4: learning the main interpolation methods and their application to numerical integration.
 RA5: learning the fundamental techniques for the discretization of ordinary and partial differential equations.
 RA6: Computing approximate solutions to initial and boundary-value problems.

Student outcomes addressed by the course

CG1 to CG13, CEB1

Bibliography and supplemental materials

BASIC BIBLIOGRAPHY:

Burden, J.D. y Faires, R.L. (2002). Análisis Numérico, 7ª ed. International Thomson Editores, México.

Faires, R.L. y Burden, J.D., (2004). Métodos Numéricos, 3ª ed. Thomson-Paraninfo, Madrid.

COMPLEMENTARY BIBLIOGRAPHY:

Brenner, S.C. y Scott, L.R. (2002). The Mathematical Theory of Finite Element Methods, 2nd ed. Springer-Verlag, New York.

Lambert, J.D. (1991). Numerical Methods for Ordinary Differential Systems. John Wiley & Sons, Chichester.

Morton, K.W. y Mayers, D.F. (2005). Numerical Solution of Partial Differential Equations: An Introduction, 2nd ed. Cambridge University Press. New York.

Quarteroni, A., Sacco, R. y Saleri, F. (2000). Numerical Mathematics, Springer-Verlag, New York.

Quarteroni, A. y Saleri, F. (2003). Scientific Computing with MATLAB, Springer-Verlag, Berlín.

Quarteroni, A. y Valli, A. (1994). Numerical Approximation of Partial Differential Equations. Springer-Verlag. Berlín.

Stoer, J. y Bulirsch, R. (2002). Introduction to Numerical Analysis, 3rd ed. Springer-Verlag, New York.

Trefethen, L.N. y Bau, L. (1997). Numerical Linear Algebra. SIAM. Philadelphia.

Teaching methodology

<input checked="" type="checkbox"/> lectures	<input type="checkbox"/> problem solving sessions	<input type="checkbox"/> collaborative actions	<input checked="" type="checkbox"/> laboratory sessions
--	---	--	---

Other: