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

Course number and name	
Number	95000001
Name	Algebra Álgebra
Semester	Y1-S1

Credits and contact hours	
ECTS Credits	6
Contact hours	60

Coordinator's name	Martin Garcia, Lorenzo Javier

Specific course information		
Description of course content		
A course of Linear Algebra, starting with mathematical language and reasoning, the concepts of sets, algebraic structures and functions; including the knowledge and relations between systems of linear equations, vector spaces and homomorphisms; orthogonality; and diagonalization of endomorphisms.		
List of topics to be covered		
1. Mathematical language and reasoning, Basic algebraic structures, Boolean algebra and Functions between sets. 2. Matrix Algebra and systems of linear equations. 3. Vector Spaces. 4. Homomorphisms. 5. Scalar product and orthogonality. 6. Spectral analysis: eigenvalues, eigenvectors and diagonalization of endomorphisms.		
Prerequisites or co-requisites		
None, but it will be assumed that students have previous mathematical knowledge		
Course category in the program		
X **R (required)**	__ **E (elective)**	__ **SE (selective elective)**

Specific goals for the course
Specific outcomes of instruction
RA32 - Recognize the importance of abstract reasoning and the need to transform engineering problems to mathematical formulations. RA33 - Understand the advantages and scope of mathematical language in describing technical problems. RA35 - Solve systems of linear algebraic equations, and extract their algebraic information. RA36 - Know and understand the structure and properties of vector spaces. RA37 - Know how to represent applications between vector spaces, and be fluent in matrix calculus. RA123 - Know and apply the properties of vector spaces endowed with an inner product. RA124 - Determine whether a matrix/endomorphism is diagonalizable by calculating eigenvalues and eigenvectors RA125 - Know the properties of Boolean algebra
Student outcomes addressed by the course
CEB1, CEB4, CG1, CG2, CG4, CG5.

Bibliography and supplemental materials
BASIC BIBLIOGRAPHY - E. Hernández, M.J. Vázquez, M.A. Zurro. *Álgebra lineal y Geometría (3rd Ed.)*. Pearson. Madrid, 2012. - M. Guzmán. *Cómo hablar, demostrar y resolver en Matemáticas*. Ed. ANAYA, Madrid, 2004. - V. Fernández Laguna. T*eoría básica de conjuntos*. Ed. ANAYA, Madrid, 2003. - Own material from the course: summaries, solved problems, solved exams, etc. COMPLEMENTARY BIBLIOGRAPHY - Miguel Delgado Pineda y María José Muñoz Bouzo. *Lenguaje matemático, conjuntos y números*. Ed. Sanz y Torres. Madrid, 2010. - J. Burgos. *Álgebra Lineal y Geometría Cartesiana*. McGraw-Hill. Madrid, 2002. - B. Noble y J. W. Daniel. *Applied Linear Algebra. 3rd Edition*, Prentice-Hall, 1988. MOODLE http://moodle.upm.es/titulaciones/oficiales/course/view.php?id=2167

Teaching methodology			
X **lectures**	X **problem solving sessions**	__ **collaborative actions**	__ **laboratory sessions**
Other:			