UNIVERSIDAD DE MURCIA

FACULTY OF MATHEMATICS

Linear algebra and geometry II

Syllabus

Course code:	1580
Number of ECTS credits:	6
Semester:	1st (September-January)
Prerequisites:	None
Recommended components:	Linear Algebra (1569) Affine and euclidean geometry (1574)
Language of instruction:	Spanish (students are allowed to ask questions and write homeworks and exams in English)

Course description

This course deals with conics and quadrics from a metric and projective point of view. For this purpose we introduce the basics of projective planes and we study symmetric bilinear forms on vector spaces.

Learning outcomes and competences

After completion of this course you will:

1. be able to find a diagonal matrix congruent to a given symmetric matrix.
2. be able to find a diagonal matrix equivalent to a given real symmetric matrix via an ortogonal change of basis.
3. be able to classify conics and quadrics and find their geometric elements.
4. be able to solve affine, euclidean and projective geometrical problems.
5. be able to solve problems about bilinear and quadratic forms in vector spaces.

Course contents

I. Introduction to the conic sections

II. Metric classification of conics

III. Projective plane and projective conics

IV. Bilinear and quadratic forms in vector spaces

V. Introduction to quadrics

References

Main texts

1. Burgos J. de *Curso de álgebra y geometría*; Alhambra, 1992.

Supplementary references

1. Raya A., Rider A., Rubio R. *Álgebra y geometría cuadrática*; Thomson, 2006.
2. Hernández E. *Álgebra y geometría*; Addison-Wesley, 1998.
3. Kaplansky I. *Linear algebra and geometry*; Chelsea, 1974.