

Caraterização da Unidade Curricular / Characterisation of the Curricular Unit

Designação da Unidade Curricular / Curricular Unit: [3181300258] Complementos de Geometria e de Álgebra
[3181300258] Geometry and Algebra Supplements

Plano / Plan: 2015/2016

Curso / Course: Ensino do 1.º Ciclo do Ensino Básico e de Matemática e Ciências Naturais no 2.º Ciclo do Ensino Básico

Grau / Diploma: Mestre

Departamento / Department: CEN - Ciências Exatas e Naturais

Unidade Orgânica / Organic Unit: Escola Superior de Educação de Viseu

Área Científica / Scientific Area: Área de Docência

Ano Curricular / Curricular Year: 2

Período / Term: S2

ECTS: 4

Horas de Trabalho / Work Hours: 0108:00

Horas de Contacto/Contact Hours:

(T) Teóricas/Theoretical:	0000:00	(TC) Trabalho de Campo/Fieldwork:	0000:00
(TP) Teórico-Práticas/Theoretical-Practical:	0045:00	(OT) Orientação Tutorial/Tutorial Orientation:	0000:00
(P) Práticas/Practical:	0000:00	(E) Estágio/Internship:	0000:00
(PL) Práticas Laboratoriais/Practical Labs:	0000:00	(O) Outras/Others:	0000:00
(S) Seminário/Seminar:	0000:00		

Docente Responsável / Responsible Teaching

[2014] António Augusto Gaspar Ribeiro

Outros Docentes / Other Teaching

[2014] António Augusto Gaspar Ribeiro

Learning Outcomes of the Curricular Unit

This curricular unit is intended for students to resume the work developed in Geometry and Algebra throughout the 1st cycle of studies in order to deepen the knowledge built there, seeking to articulate them in a systematic, methodical and organized way. , identifying and recognizing the different relationships between these domains thus ensuring better conditions for teaching them. Thus, the objectives of this unit are:

- Deepen the necessary knowledge to teach Geometry and Algebra in 1st and 2nd CEB;
- Develop the ability to analyze mathematical knowledge in geometry and algebra in teaching and learning situations;
- Develop the ability to identify and build mathematical knowledge from game and real-life situations and mobilize it in the classroom.

Learning Outcomes of the Curricular Unit (Lim:1000)

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Syllabus (Lim:1000)

In this course unit we will study the following topics, in articulation with the ESP:

- Euclidean geometry and other geometries: from the real to the classroom; Cuts, sections, perspectives and shadows;
- Geometric transformations and symmetry: concepts, representations and properties; Isometries (Rotations, Translations, Reflections) and Homotetias Decorative compositions and flooring;
- Patterns (geometric and algebraic), functions and proportionality (direct and inverse);
- Relations in Algebra and Geometry;
- Problem solving and math games.

Demonstration of the syllabus coherence with the curricular units' learning objectives

Geometry and algebra are fields par excellence for the development of capacities, such as abstraction and generalization, capacities that are the objectives of mathematics teaching, offering conditions for achieving successive levels of abstraction. Continuing the themes addressed in the 1st cycle of studies, it is intended that students are able to articulate geometry with algebra in solving concrete problems and establish connections between different areas of mathematics. It is also intended that they develop their communication, reasoning and problem-solving skills.

Teaching Methodologies (Including evaluation; Lim:1000)

In accordance with the new teaching paradigm advocated by the Bologna process, we advocate teaching based on a competence development model, which includes both generic and specific ones associated with the area of training, argues the use of group work and individual work and it is considered that students should be provided with diverse learning experiences including problem solving, demonstration and use of manipulable materials and AGDs and other software. In addition, in addressing the issues a historical framework should be made.

The evaluation of the students will be done continuously. Each student should also perform: i) an individual written work (60%) and ii) a research work on a programmatic theme, in group and with discussion in class (40%).

Demonstration of the coherence between the teaching methodologies and the learning outcomes

Considering that it is intended that students reach increasingly elaborate stages at the level of formalization, it is sought that the student goes through the manipulation of different representations of figures and solids, try models constructed on paper or in environments of dynamic geometry of these same figures, establish relationships between these and real objects and, finally, develop their ability to communicate that is intended strictly when using oral language and written language. It is in the articulation between geometric experience and the use of algebra that students, throughout their formative process, are achieving ever higher levels at the level of rigor with which they communicate their experiences, approaching, as far as possible, the most abstract level of mathematical formalization.

Bibliografia / Bibliography (Lim:1000)

Abrantes, P.; Serrazina, L.; Oliveira, I. (1999). A matemática na educação básica. Lisboa: DEB.

Estrada, Maria Fernanda & Correia de Sá (Coords.) (2001) História da Matemática. Lisboa: Universidade Aberta

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Lang, S., Murrow, G. (1983). Geometry: A high school course. Springer Verlag.

Loureiro, C.; Oliveira, A. F.; Ralha, E.; Bastos, R. (1997). Matemática ζ Geometria. Lisboa: Ministério da Educação ζ DES.

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Moise, E. (1981). Elementary Geometry from an Advanced Standpoint. New York: Addison Wesley Publishing Company.

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