Course Unit	Option III - Mathematics and Art			Field of study	Training in Teaching Area		
Bachelor in	Basic Education			School	School of Education		
Academic Year	2022/2023	Year of study	3	Level	1-3	ECTS credits	3.0
Type	Semestral	Semester	2	Code	9853-531-3205-10-22		

Workload (hours)	81	Contact hours	T	-	TP	27	PL	-	TC	-	S	-	E	-	OT	9	O	-

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s)	Maria Cristina do Espírito Santo Martins

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Identify and analyze mathematical regularities.
2. Select and relate mathematical concepts, representations and procedures in the understanding of art works or situations related to artistic expressions.
3. Apply mathematical concepts, representations and procedures in the interpretation and analysis of art works or situations related to artistic expressions.
4. Solve mathematical problems in contexts relating to artistic expressions, communicating their own ideas and interpreting the other people's ideas.

Prerequisites

Before the course unit the learner is expected to be able to:
1. Relate and use basic mathematical concepts.
2. Relate and use basic concepts related to artistic expressions.

Course contents

1. Numerical regularities. 2. Geometric regularities.

Course contents (extended version)

1. Numerical regularities.
   - Fibonacci numbers.
   - Golden ratio.
   - Other regularities.
   - Relations with different artistic languages.
2. Geometric regularities.
   - Symmetry.
   - Tessellations.
   - Polyhedra.
   - Relations with different artistic languages.

Recommended reading

1. Bouleau, C. (1963). La geométrie secrète des peintres. Editions du Seuil.
2. Devlin, K. (2003). Matemática: A ciência dos padrões. Porto Editora.
3. Giménez, J. (Coord.) (2009). La proporción: Arte y matemáticas. Editorial Graó.
4. Pacioli, L. (1991). La divina proporción. Ediciones Akal.
5. Veloso, E. (2012). Simetria e transformações geométricas. Associação de Professores de Matemática.

Teaching and learning methods

1. Content exploration using, for example, explanation processes, texts discussions, writing reports or researching work. 2. Discussions of themes in small or large groups. 3. Individual or group work. 4. Resolution of tasks of different type and nature.

Assessment methods

1. Continuous assessment - (Regular, Student Worker) (Final)
   - Intermediate Written Test - 50% (Written summative test.)
   - Work Discussion - 50% (Implementation and discussion of the proposed tasks or the individual or group works.)
2. Assessment by examination - (Regular, Student Worker) (Supplementary, Special)
   - Final Written Exam - 100%

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

Maria Cristina do Espírito Santo Martins	Maria Cristina do Espírito Santo Martins	Elza da Conceição Mesquita	Carlos Manuel Costa Teixeira
08-01-2023	08-01-2023	08-01-2023	09-01-2023

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