Course Unit	Option 1 - Science and Art			Field of study	Educational Sciences		
Master in	Science Education			School	School of Education		
Academic Year	2020/2021	Year of study	1	Level	2-1	ECTS credits	4.0
Type	Semestral	Semester	1	Code	5016-627-1102-01-20		

Workload (hours)	108	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): Luís Manuel Leitão Canotilho

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Understand the importance of science in the evolution and practice of the artwork.
2. Recognize the importance of mathematics, through geometry, the organization of artistic composition.
3. Identify the existence concepts and geometric structures in artistic composition.
4. Recognize that the evolution of the work of art is dependent on scientific knowledge through the discovery of new materials and techniques involved in their enforcement.
5. Recognizing that scientific knowledge is the basis of all artistic production at the technological level.
6. Recognize that science can be observed and reported through the artistic representations.
7. Explore the works of art in scientific knowledge function (structure, materials and production processes).

Prerequisites

Before the course unit the learner is expected to be able to:
No prerequisites.

Course contents

Mathematics in Art as a fundamental tool in artistic production through geometry, golden ratio, the canon, etc. , the level of achievement of the creative project. Science as a fundamental knowledge in the field of architecture, art and design at the level of the technical implementation procedures and knowledge of the materials used.

Course contents (extended version)

1. Mathematics in art primarily through geometry.
2. Historical context.
3. Harmony and proportion: Golden Ratio.
4. The Golden Ratio in the fields of architecture, art and design.
5. The Golden Ratio in the construction of the human figure: Canon.
6. Module standard and sense of symmetry in art. Impact on Portuguese tradition.
7. Science as a fundamental knowledge in the field of architecture, art and design.
8. The importance of knowledge of materials and their respective properties.
9. Dependence of the art in relation to technological knowledge.
10. Different perspectives on the "scientific objects" such as microscopes, telescopes and others.
11. The scientific illustration as an important part of scientific discourse and educational tool.
12. The importance of photography as a technique to monitor the development of a project.
13. Development of an "art project" using DNA representation methods, etc.

Recommended reading

1. Barton, G. (2014). Literacy in the Arts. Retheorising Learning and Teaching. Springer e Books. ISBN: 978-3-319-04846-8.
2. Cabezas, L. & Vílchez, L. (2016). Dibujo Científico. Arte Y Naturaleza, Ilustración Científica, Infografía, Esquemática. Catedra edición. ISBN: 8437635462.
3. Dondis, D. (1997). La sintaxe de la imagen. Introducción al alfabeto visual. Editorial Gustavo Gil. Barcelona.
4. González, P. (2007). Arte, ciencia y tecnologia. Editor: Editorial UOC, S. L. Colección: TIC. CERO. ISBN: 8497886089.
5. Castro, S. & Marcos, A. (2010). ARTE Y CIENCIA: Mundos convergentes. Editor: PLAZA Y VALDÉS EDITORES; Edición: 01. ISBN-10: 8492751711.

Teaching and learning methods

Once understood the theoretical concepts related to geometry and its application in the field of visual arts classes will be taught in places such as museums and cultural centers, where students through the study of the works seek possible geometric structures.

Assessment methods

1. CONTINUOUS EVALUATION - (Regular, Student Worker) (Final)
   - Reports and Guides - 60% (Projects)
   - Presentations - 40% (Presentations)
2. EVALUATION OF EXAMINATION - (Regular, Student Worker) (Supplementary, Special)
   - Final Written Exam - 100%

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

Luís Manuel Leitão Canotilho	Jacinta Helena Alves Lourenço Casimiro da Costa	Delmina Maria Pires	António Francisco Ribeiro Alves
07-12-2020	14-02-2021	14-02-2021	15-02-2021