Course Unit	Didactics of Science			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	10.0
Type	Semestral	Semester	2	Code	5016-627-1201-00-20		

Workload (hours)	270	Contact hours	T	TP	PL	TC	S	E	OT	O
			-	36	27	-	-	-	27	-

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): Delmina Maria Pires

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Discuss emerging knowledge of research in science teaching, drawing conclusions valid for teaching practice.
2. Substantiate the need to develop a teaching/learning process that consider the different dimensions of science and reflect why and what to teach science.
3. Justify the importance of previous knowledge of students in the formation of new concepts.
4. Reflect on the different perspectives of teaching science, and its evolution, relating them to the different theories that underlie it.
5. Explain the theoretical foundations of cognitivism, constructivism and socio-constructivism in the perspective of learning.
6. Discuss contributions to student of exploration of scientific and technological knowledge from the interaction science, technology, society and environment.
7. Mobilising various knowledge in planning strategies and the implementation of education activities that contribute to student success.
8. Substantiate the importance of a careful analysis of textbooks before being selected as textbooks for students.

Prerequisites

Before the course unit the learner is expected to be able to:
No pre-requisitos.

Course contents

1. Science, education in science and and learning and teaching science; 2. Relevance of science in formation of individuals; 3. Learning science; 4. Teaching science; 5. Pedagogical practice and its influence on academic success; 6. Analysis of textbooks.

Course contents (extended version)

1. Science, education in science and learning and teaching science.
2. Relevance of education in science in the formation of individuals.
3. Learning science.
   - Previous knowledge of students and its influence on the construction of new concepts.
   - Alternative conceptions: what they are, how they form and why persist.
   - Strategies of conceptual change.
   - Learning theories and teaching models (From transmission To research).
4. Teaching science.
   - CTSA (science, technology, society, environment) approach in teaching science.
   - Experimental, discussion and problem solving strategies - design and realization.
   - Assessment of learning.
5. Pedagogical Practice and its influence on academic success.
   - Characteristics of pedagogic practice more conducive to student success.
   - Importance of the family in the relation practical pedagogical/performance in science.
6. Analysis of textbooks.

Recommended reading

1. Acevedo-Díaz, J. A. (2009). Enfoques Explícitos versus implícitos en la enseñanza de la naturaleza de la ciencia. Revista Eureka sobre Enseñanza y Divulgación de las Ciencias, 6(3), 355-386.
2. Fernandes, I., Pires, D., & Delgado-Iglesias, J. (2017). Ciência-Tecnologia-Sociedade-Ambiente nos documentos curriculares portugueses de ciências. Revista Cadernos de Pesquisa, 47 (165), 998-1015.
3. Millar, R. (2010). Analyzing practical science activities to assess improve their effectiveness. Hatfield: Association Science Education.
4. Occeli, M. , & Valeiras, N. (2013). Los libros de texto de ciencias como objeto de investigación: una revisión bibliográfica, Enseñanza de las Ciencias, 31(2), 133-152.
5. Pires, D. et al. (2004). Desenvolvimento científico nos primeiros anos de escolaridade: Estudo de características sociológicas específicas da prática pedagógica. Revista de Educação, XII (2).

Teaching and learning methods

The course has a strong reflective, interactive and practical component. Some classes having a theoretical nature, the presentation of content is made by the teacher, but with the intervention of students. From reading the handouts, articles and research, it promotes reflection and debate on the themes of the teaching of science. There will opportunity to make various individual and group work.

Assessment methods

1. Alternative 1: Continuous Evaluation - (Regular, Student Worker) (Final)
   - Development Topics - 50% (Realization of a individual work.)
   - Presentations - 50% (Presentation and discussion of the various practical works carried out in the classroom.)
2. Alternative 2: Rating of Exam - (Regular, Student Worker) (Supplementary, Special)
   - Presentations - 50% (Reformulation/improvement of individual work.)
   - Presentations - 50% (Presentation and discussion of the various practical works carried out in the classroom.)

Language of instruction

Portuguese

Electronic validation

Delmina Maria Pires	Paulo Miguel Mafra Gonçalves	Delmina Maria Pires	António Francisco Ribeiro Alves
02-12-2020	11-12-2020	11-12-2020	12-12-2020