INSTITUTO POLITÉCNICO DE BRAGANÇA

Course Unit	Algebra			Field of study	Training in Teaching Area		
Bachelor in	Basic Education			School	School of Education		
Academic Year	2022/2023	Year of study	1	Level	1-1	ECTS credits	6.0
Type	Semestral	Semester	2	Code	9853-531-1201-00-22		

Workload (hours)	162	Contact hours	T	-	TP	54	PL	-	TC	-	S	-	E	-	OT	18	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): Manuel Celestino Vara Pires, Cristina MArcela Cordeiro Seabra

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Identify algebraic concepts and procedures in diversified contexts.
2. Relate algebraic concepts and procedures in diversified contexts.
3. Apply algebraic concepts and procedures in diversified contexts.
4. Work independently, researching, collecting, interpreting and presenting information.
5. Solve mathematical problems, 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. Read and interpret mathematical information.
2. Relate and use basic algebraic concepts.

Course contents

1. Mathematical reasoning. 2. Binary relations. 3. Sequences and regularities 4. Algebraic expressions and properties of operations. 5. Proportionality. 6. Functions and Cartesian graphs.

Course contents (extended version)

1. Mathematical reasoning.
   - Types of reasoning: abductive, inductive, deductive.
2. Binary relations.
   - Sets and Cartesian product.
   - Binary relations: definition, properties, examples.
   - Equivalence relations: properties, equivalence classes.
   - Order relations: properties, types.
3. Sequences and regularities.
   - Sequence formation law, generating expression.
   - Patterns.
4. Algebraic expressions and properties of operations.
   - Definition, types, examples.
   - Equations and inequalities in different number sets.
5. Proportionality.
   - Ratio, proportion.
   - Direct proportionality, inverse proportionality.
6. Functions and Cartesian graphs.
   - Function: definition, properties, types, examples.
   - Graphical representation of functions.

Recommended reading

1. Palhares, P. (Ed.) (2004). Elementos de matemática para professores do ensino básico. Lidel.
2. Palhares, P., Gomes, A., & Amaral, E. (Eds.) (2011). Complementos de matemática para professores do ensino básico. Lidel.
3. Ponte, J. P., Branco, N., & Matos, A. (2009). Álgebra no ensino básico. DGIDC, Ministério da Educação.
4. Vale, I., & Pimentel, T. (Eds.) (2011). Padrões em matemática: Uma proposta didática no âmbito do novo programa para o ensino básico. Texto Editores.
5. Martinho, M. H., Tomás Ferreira, R., Vale, I., & Ponte, J. P. (Orgs.) (2011). Ensino e aprendizagem da álgebra - EIEM 2011. Sociedade Portuguesa de Investigação em Educação 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 - 30% (Written summative test)
   - Intermediate Written Test - 30% (Written summative test)
   - Work Discussion - 40% (Implementation and discussion of the proposed tasks or individual or group works)
2. Assessment by examination - (Regular, Student Worker) (Supplementary, Special)
   - Final Written Exam - 100%

Language of instruction

Portuguese

Electronic validation

Manuel Celestino Vara Pires	Maria Cristina do Espírito Santo Martins	Elza da Conceição Mesquita	Carlos Manuel Costa Teixeira
12-12-2022	19-12-2022	20-12-2022	02-01-2023