Study Plan

School: School of Social Sciences
Degree: Master
Course: Teaching Mathematics in the 3rd Cycle of Basic School and in Secondary School (cód. 749)

1st Year - 1st Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PED12622M	Research Methodologies in Education	Education Sciences	6	Semester	156
PSI11440M	Educational Psychology	Psychology	6	Semester	156
MAT11192M	Geometry	Mathematics	6	Semester	156
MAT11193M	Principles of Probabilities and Statistics	Mathematics	6	Semester	156
PED11194M	Foundations of Didactics of Mathematics	Education Sciences	6	Semester	156

1st Year - 2nd Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PED11195M	Didactics of Mathematics	Education Sciences	12	Semester	312
MAT11197M	Mathematical Modelling	Mathematics	6	Semester	156
PED11178M	Educational Administration and Management	Education Sciences	6	Semester	156

Group of Options

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PED11184M	School Environment Communication	Education Sciences	6	Semester	156
PED11185M	Education for Citizenship	Education Sciences	6	Semester	156
PED11187M	Information and Communication Technologies	Education Sciences	6	Semester	156

2nd Year - 3rd Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
PED11198M	Methods and Techniques of Education Research	Education Sciences	6	Semester	156
PED11200M	Learning Assessment in Mathmatics	Education Sciences	6	Semester	156
PED11207M	Supervised Teaching (EMAT)	Education Sciences	48	Year	1248

2nd Year - 4th Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours

Conditions for obtaining the Degree:

*** TRANSLATE ME: Para aprovação na componente curricular é necessário a aprovação (através de avaliação ou creditação) das seguintes unidades curriculares:{\}newline

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1º Semestre:{\}newline

5 UC obrigatórias num total de 30 Ects{\}newline

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2º Semestre:{\}newline

3 UC obrigatórias num total de 24Ects

UC do Grupo de Optativas num total de 6 Ects{\}newline

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3º Semestre:{\}newline

2 UC obrigatórias num total de 12 Ects{\}newline

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3º e 4º Semestre{\}newline

UC de Prática de Ensino Supervisionada num total de 48 ECTS{\}newline

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É necessário também a aprovação no acto público de defesa do relatório da unidade curricular relativa à prática de ensino supervisionada. ***

Program Contents

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Research Methodologies in Education (PED12622M)

1. Ontological and epistemological foundations of research in education.
2. Research and ethics: the limits of the investigator.
3. Procedures and strategies of educational research and its methodological designs.
4. Methods, techniques and tools for collecting and analyzing data on education: qualitative and quantitative approach.
5. The research project: characterization and structural elements.

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Educational Psychology (PSI11440M)

1. Development and Learning in Educational Contexts
1.1. Theories about human development; human development in context;
1.2. Perspectives on learning in educational contexts: behavioral, cognitive, sociocognitive, constructivist, socioconstructivist and ecological perspectives.
1.3. Metacognition and self-regulation of learning
2. Personal, socio-emotional and relational factors in educational processes:
2.1. Self-concept and self-esteem
2.2. motivational processes
3. Interpersonal and contextual dynamics in educational processes and contexts.
3.1. Representations and expectations in the educational relationship
3.2. Diversity(ies) in educational contexts
3.3. Educational relationship and classroom management
3.4. School climate and involvement of student in school

Back

Geometry (MAT11192M)

- Moderns elementary geometry (ulterior developments of Euclidean Geometry)
- Properties of shapes and solids. Geometrical transformations: isometries similarities and inversion.
- Symmetry of an object and its relation with art and architecture.
- Cyclic and dihedral groups, friezes and patterns.
- Study of symmetries of solids through models obtained from their planifications.
- Projective geometry and evolution of perspective in painting.
- Hyperbolic geometry and study of the Poincaré model using inversion

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Principles of Probabilities and Statistics (MAT11193M)

. Sample measures of central location and sample measures of dispersion (mean, media, fashion, variance, standard deviation, range, etc.).
. Graphical methods (bar chart, histogram, box plot, stem and leaves, ect).
. Probability Theory. Basic Laws of Probability. Law of large numbers.
. Stochastic statistical literacy.
. Correlation coefficient. Simple Regression Analysis.
. Simulation Study.
. Use of statistical software, including SPSS.

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Foundations of Didactics of Mathematics (PED11194M)

C1. The professional knowledge and the didactical knowledge of the mathematics teacher (nature, components, structure and development);
C2. The mathematical experience (from research and problem solving to solving exercices, the role of intuition and logic, the relation maths and reality, modelling and applications, informal representations and formalism, the challenges of technology)
C3. Curricular trends in mathematics education (at international and national scenarios)
C4. The learning of mathematics by the students (students' conceptions and attitudes, persistent difficulties, the importance of differentiation and integration of the error as learning resources, emphasis on meaning)

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Didactics of Mathematics (PED11195M)

C1- Mathematics syllabuses of the middle and secondary levels of education
C2- Mathematical themes and their approach in the teaching of Mathematics (Numbers, Functions, Statistics and Probability, Algebra, Geometry).
C3- Transversal mathematical processes in mathematics education (problem solving , mathematical reasoning, mathematical comunication, representations and conections)
C4- Mathematical tasks as support for learning mathematics (problems, investigations, modelation, exercices, projets, games)
C5- Manipulatives as a resource for the learning mathematics (stuctured and non stuctured materials)
C6- Digital technologies as a resource for the learning mathematics (Softwares, calculators and QI)
C7- Working methodologies for the classroom (group work, individual work and whole class work)
C8- Development models of the mathematics curriculum (from exposition to inquiry based teaching of Mathematics)

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Mathematical Modelling (MAT11197M)

-Mathematical models in life. The process of mathematical modelling;
-Computing machines. Working with a computer and a programmable calculator. Modelling in the teaching of mathematics;
-Mathematical problems of classical mechanics;
-Mathematical models in biology, ecology and economics;
-Optimization problems or minimum and maximum in our life;
-Problems of mathematical physics.

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Educational Administration and Management (PED11178M)

1. State Administration and Organization
2. Educational system, organization, and structures
2.1. Constitutional ideas and guiding principles
2.2. LBSE as a reference of the education and teaching system
2.3. Purposes of school education and organizational and pedagogical implications
2.4. Educational administration, levels, and organic structures
3. Educational administration and territorial distribution of competences
3.1. Contextual factors and socio-educational equity
3.2. Decentralization, Territorialization and Municipalization of Education
3.3. Regulatory frameworks for curriculum flexibility and inclusion
4. Educational Policies, autonomy, and school development
4.1. School organizations and structures
4.2. School management processes
4.3. Organizational and professional cultures and climates
4.4. Leadership at school
5. Class as organizational unit of analysis
5.1. Flexible organization of groups of students and teachers
5.2. Class size and composition structure

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School Environment Communication (PED11184M)

1. Human communication
2. Barriers to communication
3. First impression
4. Self-knowledge and knowledge of the other
5. Non-verbal communication in the school context

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Education for Citizenship (PED11185M)

A. Key concepts: democracy, ideology, justice, human rights, citizenship, freedom, equality, inclusion, globalization, individualism, liberalism, socialism.
B. Education for citizenship as education for values.
C. The new scenarios of citizenship education: digital citizenship, artificial intelligence, climate change, the multipolar world.
D. The National Citizenship Education Strategy.
E. The dimensions of citizenship education: (according to the DGE)
E.1. European dimension of Education.
E.2. Environmental Education for sustainability.
E.3. Consumer Education.
E.4. Financial education.
E.5. Intercultural education.
E.6. Education for Peace.
E.7. Education for Gender Equality.
E.8. Educating to avoid unnecessary risk.
E.9. Education for development.
E.10. Education for entrepreneurship.
E.11. Education for charity work.
E.12. Education for Human Rights.
E.13. Media education.
E.14. Education for road safety.
E.15. Education for health and sexuality

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Information and Communication Technologies (PED11187M)

Scientific basis of the use of technology in education
The information and communication technologies in educational contexts Multimedia in education:
Foundations and principles of multimedia learning Computational Thinking: Microworlds computational learning: Scratch / Kodu
Social networks and learning communities: the new sociability.
Security, ethics and protection of children and youth in the use of ICT
Design, planning and evaluation of curriculum projects using ICT
ICT and special educational needs (resources, educational materials and technical assistance support).

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Methods and Techniques of Education Research (PED11198M)

C1- The planning of teaching and learning situations
C2- Learning Paths
C3- Planning of teaching exploratory
C4- Resources for planning

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Learning Assessment in Mathmatics (PED11200M)

1. Concept of assessment
2. Curriculum-learning-assessment
3. Foundations of evaluation of, and for, learning.
4. Concepts of students and teachers on evaluation
5. Evaluation
5.1. Planning
5.2. Collecting
5.3. interpreting
5.4. Using the results
6. Assessment in different purposes:
6.1. Regulate the student's progress
6.2. Regulate the process of teaching
6.3. Make decisions about learning
6.4. Rate the student's achievement
7. Instruments and its different purposes
7.1. The role of different mathematics tasks in the teaching, learning and evaluation process

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Supervised Teaching (EMAT) (PED11207M)

C1- Dimensional development of teaching and learning
C2- Dimension of participation in school and its relations with the community
C3- Dimension of the professional, social and ethical
C4- Dimension of the professional development throughout life