Guía docente de la asignatura

Bases Matemáticas en la Educación Primaria

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Grado	Grado en Educación Primaria (Bilingüe)	**Rama**	Ciencias Sociales y Jurídicas
Módulo	Enseñanza y Aprendizaje de las Matemáticas	**Materia**	Bases Matemáticas en la Educación Primaria

Curso	1º	**Semestre**	1º	**Créditos**	9	**Tipo**	Obligatoria

PRERREQUISITOS Y/O RECOMENDACIONES

- Knowledge about Primary Education Mathematics

BREVE DESCRIPCIÓN DE CONTENIDOS (Según memoria de verificación del Grado)

- Study, analysis and reflection on mathematical concepts and procedures, their ways of representation and modeling, phenomenology and historical aspects, using materials and resources on Numbers and Operations, Measurement, Estimation and Calculation, Geometry (shapes and figures and their properties), Data analysis and Probability.
- The transversal contents of Mathematics in Primary Education: Number Sense, Problem Solving, Use of new technologies in Mathematics, Historical, social and cultural dimension of Maths.

COMPETENCIAS ASOCIADAS A MATERIA/ASIGNATURA

COMPETENCIAS GENERALES

- CG01 - Analizar y sintetizar la información
- CG05 - Comunicar oralmente y por escrito con orden y claridad, en la propia lengua y en una segunda lengua
- CG06 - Buscar, seleccionar, utilizar y presentar la información usando medios tecnológicos avanzados
- CG08 - Trabajar en equipo y comunicarse en grupos multidisciplinares
- CG13 - Investigar y seguir aprendiendo con autonomía

COMPETENCIAS ESPECÍFICAS

- CE01 - Conocer las áreas curriculares de la Educación Primaria, la relación interdisciplinar entre ellas, los criterios de evaluación y el cuerpo de conocimientos didácticos en torno a los procedimientos de enseñanza y aprendizaje respectivos
- CE09 - Valorar la responsabilidad individual y colectiva en la consecución de un futuro sostenible
- CE11 - Conocer y aplicar en las aulas las tecnologías de la información y de la comunicación. Discernir selectivamente la información audiovisual que contribuya a los aprendizajes, a la formación cívica y a la riqueza cultural
- CE50 - Adquirir competencias matemáticas básicas (numéricas, cálculo, geométricas, representaciones especiales, estimación y medida, organización e interpretación de la información, etc.)
- CE52 - Analizar, razonar y comunicar propuestas matemáticas
- CE53 - Plantear y resolver problemas vinculados con la vida cotidiana
- CE55 - Desarrollar y evaluar contenidos del currículo mediante recursos didácticos apropiados y promover las competencias correspondientes en los estudiantes

RESULTADOS DE APRENDIZAJE (Objetivos)

- Know and relate the main concepts, structures and procedures that make up the topics of Primary School Mathematics.
- Understand and properly employ the facts and properties of mathematical concepts and structures.
- Use mathematical procedures correctly in a written and symbolic way.
- Analyze, reason and effectively communicate mathematical arguments.
- Manage and relate the different ways of representing the mathematical concepts and procedures of Primary Education.
- Model phenomena from different disciplines with notions and basic mathematical tools.
- State, formulate and solve mathematical problems through different strategies in a variety of situations and contexts.
- Use manipulative, graphic, symbolic and technological models to express relationships, properties and mathematical operations.
- Use symbolic language in mathematics and relate it to everyday language.
- Know and manage the basic structure of the Primary Education math curriculum in terms of its contents, and describe it clearly and accurately.
- Perceive mathematical knowledge as part of our culture, with an interdisciplinary and socially useful character.
- Appreciate the educational work in mathematics as a professional, ethical and social commitment

PROGRAMA DE CONTENIDOS TEÓRICOS Y PRÁCTICOS

TEÓRICO

- **Unit 1. Natural numbers and numeration systems.** Natural numbers. Concept and uses. Quantifying and ordering. Number systems. The decimal number system.
- **Unit 2. Arithmetic**. The additive and multiplicative structures: addition and subtraction.Types of problems. Properties. Computation algorithms. Standard algorithms, and other alternative algorithms. Mental computation.
- **Unit 3. Rational numbers.** Concept and meanings of fraction. Operations with fractions. Equivalence of fractions. Rational numbers. Operations with rational numbers.

Properties. Order. Representation. Decimal numbers. Decimal representation of rational numbers. Operations with decimals. Ordination of decimals. Ratio and proportion. Percentages

- **Unit 4. Plane and spatial Geometry**. Shapes and dailylife. Geometry and its applications. Fundamental elements of the plane and space: relationships and properties. Figures in the plane (polygons and circles) and bodies in space (polyhedra and bodies of revolution): elements and properties. Flat representations of geometric bodies. Spatial Visualization.
- **Unit 5. Geometric transformations. Visualization**. Isometries in the plane: translations, rotations and symmetries; movement composition. Regularities: symmetries, friezes and rosettes. Mosaics. Locations in the plane and in space: coordinate systems. Maps, plans and networks.
- **Unit 6. Measurement of Magnitudes**. Magnitude. Quantity. Types of magnitudes. The magnitudes length, area, volume, capacity, time and money. Direct measurement of magnitudes; units of measurement systems; historical evolution. Indirect measurement of magnitudes: arithmetic and geometric proportionality. Estimation and approximation in the measure.
- **Unit 7. Introduction to Statistics and Probability**. Statistics and its applications. Statistical studies: Population, census and sample. Statistical variables, distribution. Tables and graphs. Measures of central position. Measures of dispersion. Phenomena and random experiments. Events. Probability: subjective assignment; frequency estimation and classical assignment (Laplace rule).

PRÁCTICO

The laboratory practices are associated with the four basic blocks of content (Arithmetic, Geometry, Magnitudes and their measurement and Statistics and probability) and will be carried out through the use of manipulative materials and / or computer resources. This design of laboratory practices pursues a twofold goal.

Firstly, it is intended that students, in groups and autonomously, explore and experience mathematical activities to face the work with new mathematical notions or to deepen the study of notions already introduced in previous sessions. Secondly, these activities contribute to know and use a large number of manipulatives and resources that can be used in the teaching and learning of mathematics in Primary Education.

Some of the thematic core of the four practice sections are the following:

- Arithmetic: Numbering systems; calculation: algorithms and methods; arithmetic problems; fractions and decimals.
- Geometry: Polygons: classification and properties; patterns and shapes; polyhedra: classification and basic elements; geometric transformations
- Magnitudes and measurement: Direct and indirect measures; measuring instruments; metric system.
- Statistics and probability: Organization of data; interpretation of information in the media; phenomena related to chance.

BIBLIOGRAFÍA

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- CHAPIN, S. H., & JOHNSON, A. (2006). Math Matters: Understanding the Math You Teach Grades K-8 (2nd Ed.). Sausalito, CA: Math solutions publications.
- CASTRO, E. (Edt.)(2001). Didáctica de la matemática en la Educación primaria. Madrid: Síntesis.
- GODINO, J. D. (Dir.) (2004). Matemáticas para maestros. Granada: Departamento de Didáctica de la Matemática. (Disponible en: http://www.ugr.es/local/jgodino)
- KRAUSE, E. F. (1991). Mathematics for elementary teachers. A balanced approach. Lexington, MA: D. C. Heath and Company.
- SEGOVIA. I. Y RICO, L. (Coord.) (2011). Matemáticas para maestros de educación primaria. Madrid: Pirámide.

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- ALSINA, C., BURGUES, C., FORTUNY, J. Mª. (1987). Invitación a la didáctica de la geometría. Madrid: Síntesis.
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- CASTRO E., RICO L., CASTRO E. (1988) Números y operaciones. Fundamento para una aritmética escolar. Madrid: Síntesis.
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- CHAMORRO, C., BELMONTE, J. M. (1988) El problema de la medida. Didáctica de las magnitudes lineales. Madrid: Síntesis.
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- MAZA, C. (1991). Enseñanza de la suma y de la resta. Madrid: Síntesis.
- OLMO, A., MORENO, F. y GIL, F. (1988) Superficie y volumen. ¿Algo mas que el trabajo con formulas?. Madrid: Síntesis.
- RESNICK, L. Y FORD, W. (1990). La enseñanza de las matemáticas y sus fundamentos psicológicos. Madrid: Paidós-MEC.
- SEGOVIA, I., CASTRO E., CASTRO E. y RICO L. (1989). Estimación en cálculo y medida. Madrid: Síntesis.

ADDITIONAL REFERENCES:

- Mathematics Primary Education Textbooks
- This bibliography is completed by current legislation for Spain and Andalusian Primary Education, documents and specialized journals, as well as math textbooks for the primary education of various publishers and their corresponding units guides.

ENLACES RECOMENDADOS

- http://nlvm.usu.edu/es/ (Spanish)
- http://illuminations.nctm.org/ (English)

- http://recursostic.educacion.es/descartes/web/ (Spanish)
- http://clic.xtec.cat/db/listact_es.jsp (Spanish)disc

METODOLOGÍA DOCENTE

- MD01 Aprendizaje cooperativo. Desarrollar aprendizajes activos y significativos de forma cooperativa.
- MD02 Aprendizaje por proyectos. Realización de proyectos para la resolución de un problema, aplicando habilidades y conocimientos adquiridos.
- MD03 Estudio de casos. Adquisición de aprendizajes mediante el análisis de casos reales o simulados.
- MD04 Aprendizaje basado en problemas. Desarrollar aprendizajes activos a través de la resolución de problemas.
- MD05 Metodología expositiva. Transmitir conocimientos y activar procesos cognitivos en el estudiante.
- MD06 Contrato de aprendizaje. Desarrollar el aprendizaje autónomo. Ejercitar, ensayar y poner en práctica los conocimientos previos
- MD07 Metodología CLIL/AICLE. Aprendizaje integrado de contenidos en Lengua Extranjera. Aplicable a las materias/asignaturas impartidas en modalidad bilingüe.

EVALUACIÓN (instrumentos de evaluación, criterios de evaluación y porcentaje sobre la calificación final)

EVALUACIÓN ORDINARIA

In ordinary call, the assessment of the level of acquisition of competences will be continuous and formative, attending to the aspects of the development of the subject, in which both individual and group work are considered, as well as the meaningful learning of the theoretical contents and its practical application. For this reason, it is considered compulsory to attend practical sessions of the subject, in a percentage equal to or greater than 70% of the practical sessions taught. The overall rating will correspond to the weighted score of the different sections that make up the evaluation system:

- C1. Assessment of one or several written tests.
- C2. Tasks and small projects, carried out individually or in teams.The presentation, writing and clarity of ideas, structure and scientific level, creativity, justification of what it argues, capacity and richness of the criticism that is made, and updating of the bibliography consulted will be valued.
- C3. Assessment of the degree of involvement and attitude of the students expressed in their participation in the consultations, exhibitions and debates; as well as in the elaboration of the works, individual or in team, and in the sessions of discussion. Class attendance, seminars, tutorials, group sessions will also be taken into account.

The final Qualification will include the overcoming of the different criteria of the evaluation **independently**; The weight of each of it is:

- C1: 50%
- C2: 40%
- C3: 10%

In case of not passing any of the previous sections, which make up the ordinary evaluation of the subject, the student will must pass a final test, in an extraordinary evaluation call.

According to the procedure established in articles 6 and 8 of the "Regulations for the Assessment and Qualification of students of the University of Granada" (Normativa de evaluación y de calificación de los estudiantes de la Universidad de Granada), approved by the Governing Council on May 20th, 2013, students may receive, by request made to the director of the department, to a single final evaluation that will include the theoretical and practical tests necessary to prove that they have acquired the skills described in this Teaching Guide.

EVALUACIÓN EXTRAORDINARIA

The extraordinary evaluation of the subject aims to appreciate the meaningful learning of the students regarding the theoretical contents of the subject and its practical application. So, if a student had passed any of the sections either C1 or C2 that make up the ordinary assessment of the subject, he may choose to preserve the grade of those sections that had been passed in said ordinary assessment. In other case, that is, the student has not passed any of the sections C1 and C2, the student in this call must pass one, or several, written, theoretical and practical tests with weight in the overall grade corresponding to 100%. The final qualification must include the passing of the different tests.

EVALUACIÓN ÚNICA FINAL

- According to the articles 6 & 8 of the UGR regulations on students' evaluation and scoring (Normativa de evaluación y de calificación de los estudiantes de la Universidad de Granada), the students will be able to embrace, by request made to the head of the department, to a single final evaluation that will include the theoretical and practical tests necessary to prove that they have acquired the skills described in this Teaching Guide.
- Those students who cannot accomplish with the regular assessment method for the reasons included in the "Regulations for the Evaluation and Qualification of the students of the University of Granada" (http://secretariageneral.ugr.es/pages/normativa/fichasugr/ncg7121 /!) or any other duly justified cause that prevents them from following the regime of regular assessment, may benefit from the completion of a single final evaluation in which the meaninful learning of the theoretical contents (50%) and their practical application (50%) is appreciated. The final qualification must include the overcoming of both parts.

INFORMACIÓN ADICIONAL

- In those evaluation tests that require or plan to use audio and / or video during its development, this use will be done in accordance with the guidelines established in the instructions and recommendations for the application of data protection regulations, personal or home privacy marked by the General Secretary or competent body of the UGR.
- Following Normativa de evaluación y de calificación de los estudiantes de la Universidad de Granada, approved by Consejo de Gobierno 20th May 2013:
    - The University of Granada will promote respect for intellectual property and will transmit to students that plagiarism is a practice contrary to the principles governing university education. To this end, it will proceed to recognize the authorship of the works and their protection according to the intellectual property as established by the current legislation.

- Plagiarism, understood as the presentation of a work or work done by another person as his own or the copy of texts without citing their origin and giving them as their own, will automatically lead to the numerical qualification of zero in the subject in which Would have detected, regardless of the rest of the qualifications that the student would have obtained. This consequence should be understood without prejudice to the disciplinary responsibilities that students who plagiarize could incur.