

Approval date: 28/06/2023

COURSE GUIDE

**Basic Mathematics for Primary Education (2561113)**

<b>Grado (Bachelor's Degree)</b>	Grado en Educación Primaria (Bilingüe)	<b>Branch</b>	Social and Legal Sciences
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<b>Module</b>	Enseñanza y Aprendizaje de las Matemáticas	<b>Subject</b>	Bases Matemáticas en la Educación Primaria
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<b>Year of study</b>	1º	<b>Semester</b>	1º	<b>ECTS Credits</b>	9	<b>Course type</b>	Compulsory course
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**PREREQUISITES AND RECOMMENDATIONS**

- Knowledge about Primary Education Mathematics

**BRIEF DESCRIPTION OF COURSE CONTENT (According to the programme's verification report)**

- 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.

**SKILLS**

**GENERAL SKILLS**

- 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

**SUBJECT-SPECIFIC SKILLS**



- 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

## LEARNING OUTCOMES

- 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

## PLANNED LEARNING ACTIVITIES

### THEORY SYLLABUS

1. Unit 1: Numbers and algebra
  1. Numbers. Classification, properties, representations and uses
  2. Interpretation of operations. Approach and resolution of arithmetic word problems
  3. Calculation strategies and algorithms. Properties of numbers and operations
  4. Patterns and relationships. Interpretation and representations
2. Unit 2: Geometry



1. Geometric elements in the plane and in space. Representations and visualization
  2. Properties of plane figures and 3D-shapes: Geometric modeling
  3. Transformations in the plane and regularities
  4. Reasoning and Proof in Geometry
3. Unit 3: Measurement
1. Perception of magnitudes: length, surface, volume, amplitude, mass, capacity, time and money
  2. Units of measurement: types, choice of units and conversion
  3. Direct measurement. Personal strategies
  4. Indirect measurement. Interpretation of school formulas
  5. Measurement estimation
4. Unit 4: Statistics and probability
1. Statistical studies. Collection of information, types of data and variables
  2. Data representation: tables, graphs and statistical measures. Interpretations
  3. Deducing conclusions and statistical inference
  4. Perception of random phenomena and quantification of uncertainty

## PRACTICAL SYLLABUS

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.

## RECOMMENDED READING

### ESSENTIAL READING

- CHAPIN, S. H., & JOHNSON, A. (2006). Math Matters: Understanding the Math You Teach Grades K-8 (2nd Ed.). 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. D. C. Heath and Company.
- SEGOVIA. I. Y RICO, L. (Coord.) (2011). Matemáticas para maestros de educación primaria.



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### COMPLEMENTARY READING

- ALSINA, Á. (2019). Itinerarios didácticos para la enseñanza de las matemáticas (6-12 años). Graó.
- VAN DE WALLE, J. A. (2009) Elementary and Middle School Mathematics. Teaching Developmentally. Longman.
- ALSINA, C., BURGUES, C. y FORTUNY, J. M<sup>a</sup>. (1987). Invitación a la didáctica de la geometría. Síntesis.
- ALSINA, C., BURGUES, C. y FORTUNY, J. M. (1988). Materiales para construir la geometría. Síntesis.
- BLANCO, L., CLIMENTE, N., GONZÁLEZ, M. T., MORENO, A., SÁNCHEZ-MATAMOROS, G., DE CASTRO, C. y JIMÉNEZ, C. (Eds.) (2023), Aportaciones al desarrollo del currículo desde la investigación en educación matemática. Editorial Universidad de Granada.
- BURGOS, M. (2023). Razonamiento algebraico elemental. Implicaciones en la formación de profesores. Servicio de publicaciones de la Universidad de Almería.
- CALVO, C., CARRILLO, A., DE LA FUENTE, A., DE LEÓN, M., GONZÁLEZ, M. J., GORDALIZA, A., GUEVARA, I., LÁZARO, C., MONZÓ, O., MORENO, A. J., RODRÍGUEZ, L. J., RODRÍGUEZ, J. y SERRADÓ, A. (2021). Bases para la elaboración de un currículo de Matemáticas en Educación no Universitaria. Comité Español de Matemáticas.
- CAÑADAS, M. C. (2016). Álgebra escolar: un enfoque funcional. Uno: Revista de didáctica de las matemáticas, 73, 7-13.
- CARRILLO, J., CONTRERAS, L. C., CLIMENT, N., MONTES, M. A., ESCUDERO, D. I. y FLORES, E. (2016). Didáctica de las Matemáticas para maestros de Educación Primaria. Paraninfo.
- CASTRO E., RICO L. y CASTRO E. (1988) Números y operaciones. Fundamento para una aritmética escolar. Síntesis.
- CENTENO, J. (1988). Números decimales. ¿Por qué? ¿Para qué? Síntesis.
- CHAMORRO, C. (Coord..) (2003). Didáctica de las matemáticas para primaria. Pearson-Prentice Hall.
- CHAMORRO, C. y BELMONTE, J. M. (1988). El problema de la medida. Didáctica de las magnitudes lineales. Síntesis.
- GARCÍA-PEREZ, M. T. y ADAMUZ-POVEDANO, N. (2019). Del número al sentido numérico y de las cuentas al cálculo táctico. Fundamentos, recursos y actividades para iniciar el aprendizaje. Octaedro.
- GODINO, J. D., BATANERO, C. y CAÑIZARES, M. J. (1987) Azar y probabilidad. Síntesis.
- GOMEZ B. (1988). Numeración y Cálculo. Síntesis.
- GUILLEN G. (1991). Poliedros. Síntesis.
- LLINARES, S. y SANCHEZ, V. (1988). Fracciones. Síntesis.
- MAZA, C. (1991). Enseñanza de la suma y de la resta. Síntesis.
- OLMO, A., MORENO, F. y GIL, F. (1988) Superficie y volumen. ¿Algo mas que el trabajo con formulas? Síntesis.
- RESNICK, L. y FORD, W. (1990). La enseñanza de las matemáticas y sus fundamentos psicológicos. Paidós-MEC.
- SEGOVIA, I., CASTRO E., CASTRO E. y RICO L. (1989). Estimación en cálculo y medida. Síntesis.
- VAN DE WALLE, J. A. (2009) Elementary and Middle School Mathematics. Teaching Developmentally. Longman.

### RECOMMENDED LEARNING RESOURCES/TOOLS



- Primary School Mathematics textbooks
- <http://nlvm.usu.edu/es/> (Spanish)
- <http://illuminations.nctm.org/mobile/> (English)
- <http://recursostic.educacion.es/descartes/web/> (Spanish)
- [http://clic.xtec.cat/db/listact\\_es.jsp](http://clic.xtec.cat/db/listact_es.jsp) (Spanish)
- <https://intef.es/recursos-educativos/recursos-para-el-aprendizaje-en-linea/matesgg/> (Spanish)
- <https://es.mathigon.org/> (Spanish)
- <https://www.geogebra.org/> (English/Spanish)
- <https://tuvalabs.com/> (Spanish)
- <https://pensamientoalgebraico.es/es/actividades/primaria-6-11-anos> (English/Spanish)
- <https://nrich.maths.org/> (English)

## TEACHING METHODS

- 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.

## ASSESSMENT METHODS (Instruments, criteria and percentages)

### ORDINARY EXAMINATION DIET

The evaluation of the level of acquisition of the competences, in ordinary call, will be continuous and formative, taking into account the aspects of the development of the subject, in which individual and group work is appreciated, as well as the significant learning of the theoretical contents and its practical application. To opt for continuous evaluation, it will be essential that the teacher has observations of each student in a percentage equal to or greater than 70% of the practical classes taught. These observations will focus on their way of working, their commitment to the subject, dedication to it or the skills they show, among others.

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.

### EXTRAORDINARY EXAMINATION DIET

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.

### SINGLE FINAL ASSESSMENT (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" (<https://www.ugr.es/sites/default/files/2017-09/examenes.pdf>) 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 meaningful learning of the theoretical contents (50%) and their practical application (50%) is appreciated. The final qualification must include the overcoming of both parts.

### ADDITIONAL INFORMATION

- 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.

