

Approval date: 11/07/2024

COURSE GUIDE

Teaching and Learning of Mathematics in Primary Education (2561127)

Grado (Bachelor's Degree)	Grado en Educación Primaria (Bilingüe)	Branch	Social and Legal Sciences
----------------------------------	--	---------------	---------------------------

Module	Enseñanza y Aprendizaje de las Matemáticas	Subject	Enseñanza y Aprendizaje de las Matemáticas en la Educación Primaria
---------------	--	----------------	---

Year of study	2º	Semester	2º	ECTS Credits	6	Course type	Compulsory course
----------------------	----	-----------------	----	---------------------	---	--------------------	-------------------

PREREQUISITES AND RECOMMENDATIONS

To have completed the subject [Basic Mathematics for Primary Education](#) of the Primary Education Teacher Training of the University of Granada.

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

Foundations of Didactics of Mathematics. Teaching and learning of the different thematic cores of mathematics in Primary Education (Arithmetic, Geometry, Measurement, Statistics and Probability, and Algebra), specified in cognitive aspects (mathematical learning, errors and difficulties) and didactic aspects (tasks and activities, materials and resources), referring to the number sense, measurement sense, spatial sense, stochastic sense and algebraic sense.

SKILLS

GENERAL SKILLS

- CG01 - Analizar y sintetizar la información
- CG02 - Organizar y planificar el trabajo
- CG03 - Identificar, formular e investigar problemas
- CG04 - Examinar alternativas y tomar decisiones
- 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
- CG09 - Expresar y aceptar la crítica



- CG13 - Investigar y seguir aprendiendo con autonomía
- CG15 - Trabajar de forma autónoma y liderar equipos
- CG19 - Comprender y relacionar los conocimientos generales y especializados propios de la profesión teniendo en cuenta tanto su singularidad epistemológica como la especificidad de su didáctica
- CG20 - Concebir la profesión docente como un proceso de aprendizaje permanente adaptándose a los cambios científicos, pedagógicos y sociales a lo largo de la vida y comprometido con la innovación, la calidad de la enseñanza y la renovación de prácticas docentes, incorporando procesos de reflexión en la acción y la aplicación contextualizada de experiencias y programas de validez bien fundamentada
- CG21 - Comprender la complejidad de los procesos educativos en general y de los procesos de enseñanza-aprendizaje en particular
- CG22 - Conocer los fundamentos científicos y didácticos de cada una de las áreas y las competencias curriculares de la Educación Primaria: su proceso de construcción, sus principales esquemas de conocimiento, la relación interdisciplinar entre ellas, los criterios de evaluación y el cuerpo de conocimientos didácticos en relación con los procedimientos de enseñanza y aprendizaje respectivos
- CG26 - Fomentar en el alumnado hábitos lectores y el análisis crítico de textos de los diversos dominios científicos y humanísticos incluidos en el currículo escolar
- CG29 - Adquirir destrezas, estrategias y hábitos de aprendizaje autónomo y cooperativo y promoverlos entre los estudiantes, estimulando el esfuerzo personal y colectivo
- CG34 - Mantener una actitud crítica y autónoma en relación con los saberes, valores y prácticas que promueven las instituciones sociales valorando especialmente el papel de la ciencia y la tecnología en la sociedad, así como la importancia de una sólida formación humanística
- CG35 - Conocer y aplicar en las actividades de aula las tecnologías de la información y la comunicación, para impulsar un aprendizaje comprensivo y crítico. Discernir selectivamente la información audiovisual que contribuya a los aprendizajes, a la formación cívica y a la riqueza cultural

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
- CE02 - Diseñar, planificar y evaluar procesos de enseñanza y aprendizaje, tanto individualmente como en colaboración con otros docentes y profesionales del centro
- CE04 - Diseñar y regular espacios de aprendizaje en contextos de diversidad y que atiendan a la igualdad de género, a la equidad y al respeto a los derechos humanos que conformen los valores de la formación ciudadana
- CE05 - Fomentar la convivencia en el aula y fuera de ella, resolver problemas de disciplina y contribuir a la resolución pacífica de conflictos. Estimular y valorar el esfuerzo, la constancia y la disciplina personal en los estudiantes
- CE09 - Valorar la responsabilidad individual y colectiva en la consecución de un futuro sostenible
- CE10 - Reflexionar sobre las prácticas de aula para innovar y mejorar la labor docente. Adquirir hábitos y destrezas para el aprendizaje autónomo y cooperativo y promoverlo entre los estudiantes
- 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
- CE12 - Comprender la función, las posibilidades y los límites de la educación en la sociedad actual y las competencias fundamentales que afectan a los colegios de educación



primaria y a sus profesionales. Conocer modelos de mejora de la calidad con aplicación a los centros educativos

- CE51 - Conocer el currículo escolar de matemáticas
- CE52 - Analizar, razonar y comunicar propuestas matemáticas
- CE55 - Desarrollar y evaluar contenidos del currículo mediante recursos didácticos apropiados y promover las competencias correspondientes en los estudiantes

LEARNING OUTCOMES

- Know and value the social and cultural importance of mathematics as well as its role in the educational system and in the curriculum.
- Characterize the learning of schoolchildren at different ages based on the competencies that they must develop from mathematics in Primary Education.
- Interpret the role of error in learning mathematics and describe the main errors and difficulties that may arise in the process of learning mathematics in Primary Education.
- Pose and solve mathematical problems of different complexity through a variety of ways, contrasting the convenience of each one and analysing the role they can play in teaching.
- Describe and analyse different teaching strategies and techniques that promote the development of mathematical competence in schoolchildren in an environment of equity and respect.
- Know and use appropriate means, materials and resources in the teaching of mathematics, with special attention to information and communication technologies.
- Consolidate specialized knowledge of mathematical content from the specific perspective of teaching and learning in Primary Education.
- Perform queries, searches and reports on the teaching and learning of mathematics with autonomy, clarity, precision and rigor.

PLANNED LEARNING ACTIVITIES

THEORY SYLLABUS

- **Unit 1.** Mathematics, culture and society. The social and cultural importance of mathematics. Mathematics in the educational system. Purposes of mathematics education. Solving mathematical problems.
- **Unit 2.** Mathematical sense. Number sense. Measurement sense. Spatial and geometric sense. Stochastic sense. Algebraic sense. Features and components.
- **Unit 3.** Teaching and learning of mathematics (arithmetic, measurement, geometry, stochastics and algebra). Learning expectations, learning stages, mistakes and difficulties in learning mathematics. Diagnosis and treatment of difficulties in mathematics. The role of the teacher of mathematics, teaching techniques and strategies. Activities and tasks in mathematics, the role of materials and resources. Methodology for teaching mathematics based on problem solving.

PRACTICAL SYLLABUS

- Mathematical knowledge in Primary Education.
- Problem solving in mathematics.
- Identification, analysis and classification of errors and difficulties in school problems in Primary Education.



- Analysis, selection and design of mathematical tasks, according to components of mathematical sense and knowledge put into play.

RECOMMENDED READING

ESSENTIAL READING

- **Consejería de Educación y Deporte (2021)**. Orden de 15 de enero de 2021, por la que se desarrolla el currículo correspondiente a la etapa de Educación Primaria en la Comunidad Autónoma de Andalucía, se regulan determinados aspectos de la atención a la diversidad, se establece la ordenación de la evaluación del proceso de aprendizaje del alumnado y se determina el proceso de tránsito entre distintas etapas educativas. Consejería de Educación y Deporte. https://usie.es/andalucia/wp-content/uploads/sites/3/2022/07/Orden-de-15-de-enero-de-2021_Primeria.pdf
- **Flores, P. & Rico, L. (Eds.) (2015)**. Enseñanza y aprendizaje de las matemáticas en Educación Primaria. Pirámide.
- **Godino, J. D. (Dir.) (2004)**. Didáctica de las matemáticas para maestros. Departamento de Didáctica de la Matemática. Universidad de Granada. https://www.ugr.es/~jgodino/edumat-maestros/manual/9_didactica_maestros.pdf
- **Jefatura del Estado (2020)**. Ley Orgánica 3/2020, de 29 de diciembre, por la que se modifica la Ley Orgánica 2/2006, de 3 de mayo, de Educación. Boletín Oficial del Estado 340, 30 de diciembre de 2020. <https://www.boe.es/boe/dias/2020/12/30/pdfs/BOE-A-2020-17264.pdf>
- **Ministerio de Educación y Formación Profesional (2022)**. Orden EFP/279/2022, de 4 de abril, por la que se regulan la evaluación y la promoción en la Educación Primaria, así como la evaluación, la promoción y la titulación en la Educación Secundaria Obligatoria, el Bachillerato y la Formación Profesional en el ámbito de gestión del Ministerio de Educación y Formación Profesional. Boletín Oficial del Estado, 84, 8 de abril de 2022. <https://www.boe.es/boe/dias/2022/04/08/pdfs/BOE-A-2022-5687.pdf>
- **Ministerio de Educación y Formación Profesional (2022)**. Real Decreto 157/2022, de 1 de marzo, por el que se establecen la ordenación y las enseñanzas mínimas de la Educación Primaria. Boletín Oficial del Estado 52, 2 de marzo de 2022. <https://www.boe.es/buscar/pdf/2022/BOE-A-2022-3296-consolidado.pdf>
- **National Council of Teachers of Mathematics (2000)**. Principles and standards for school mathematics. NCTM.
- **Organisation for Economic Cooperation and Development (2018)**. PISA 2021 Mathematics Framework (Draft). <https://www.oecd.org/pisa/sitedocument/PISA-2021-mathematics-framework.pdf>
- **Organisation for Economic Cooperation and Development (2012)**. PISA 2012 Assessment and Analytical Framework Mathematics, Reading, Science, Problem Solving and Financial Literacy. https://www.oecd.org/pisa/pisaproducts/PISA%202012%20framework%20e-book_final.pdf

Other resources:

- **Mathematics Textbooks for Primary Education.**

COMPLEMENTARY READING



- **Alsina, Á. (2019).** Itinerarios didácticos para la enseñanza de las matemáticas (6-12años). Graó Educación.
- **Alsina, C., Burgues, C., & Fortuny, J.M. (1998).** Enseñar matemáticas. Barcelona: Grao.
- **Bihsop, A. J. (1999).** Enculturación matemática. La educación matemática desde una perspectiva cultural. Temas de educación. Paidós.
- **Carrillo Yáñez, J. (Coord.) (2016).** Didáctica de las matemáticas para maestros de Educación primaria. Paraninfo.
- **Castro, E. (Ed.) (2001).** Didáctica de la matemática en educación primaria. Síntesis.
- **Chamorro C. (2003).** Didáctica de las matemáticas para primaria. Pearson-Prentice Hall.
- **Jiménez, J. (1997).** Evaluación en matemáticas. Una integración de perspectivas. Síntesis.
- **Martínez Montero, J. & Sánchez Cortés, C. (2017).** Resolución de problemas y método ABN. Wolters Kluwer.
- **Resnick, L. & Ford, W. (1990).** La enseñanza de las matemáticas y sus fundamentos psicológicos. Paidós-MEC.
- **Rico, L., Fortuny, J. M., & Puig, L. (1987-91).** Matemáticas, cultura y aprendizaje (colección). Síntesis.
- **Segovia, I. & Rico, L. (Eds.) (2013).** Matemáticas para maestros de Educación Primaria. Pirámide.
- **Van de Walle, J. A. (2009).** Elementary and Middle School Mathematics. Teaching Developmentally. Longman: New York.

RECOMMENDED LEARNING RESOURCES/TOOLS

- http://clic.xtec.cat/db/listact_es.jsp (Spanish)
- <https://es.mathigon.org/polypad> (Spanish)
- <https://www.geogebra.org> (English, Spanish, etc.)
- <http://illuminations.nctm.org> (English)
- <https://intef.es> (Spanish)
- <https://intef.es/recursos-educativos/situaciones-aprendizaje> (Spanish)
- <https://www.nctm.org/Standards-and-Positions/Principles-and-Standards/Algebra> (English)
- <https://www.nctm.org/Standards-and-Positions/Principles-and-Standards/Geometry> (English)
- <https://www.nctm.org/Standards-and-Positions/Principles-and-Standards/Measurement> (English)
- <https://www.nctm.org/Standards-and-Positions/Principles-and-Standards/Number-and-Operations> (English)
- <http://nlvm.usu.edu/es> (Spanish)
- <https://nrich.maths.org> (English)
- <https://pensamientoalgebraico.es/es/actividades/primaria-6-11-anos> (Spanish)
- <http://recursostic.educacion.es/descartes/web> (Spanish)
- <https://tuvalabs.com> (Spanish)
- https://www.ugr.es/~jgodino/edumat-maestros/manual/8_matematicas_maestros.pdf (Spanish)

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 and development of the competencies, in ordinary examination and under the continuous evaluation method, will be continuous and formative, taking into account the aspects of the development of the subject, in which individual and group work and the significant learning of the theoretical contents and its practical application can be assessed. The assessment of the development of competencies and the degree of involvement and attitude of the students will be carried out using observation instruments. To issue these evaluations, it will be essential that the teacher has observations of each student about their way of working (individual or in group), their commitment to the subject, their dedication to it or the skills they manifest, among other things, in a percentage equal to or greater than 80% of the practical sessions taught. The methodological characteristics of the sessions mean that these observations are carried out in small group sessions, which correspond to practical classes or seminars. In this case, the overall grade will correspond to the weighted score of the different parts and activities that make up the evaluation system:

- **Part 1.** Assessment of one or more tests (that may include essay questions, short answer questions, problem solving, questions referring to cases or assumptions, questions to discuss the truth/falsehood of certain statements, etc.).
- **Part 2.** Assessment of tasks and/or works carried out, individually or in a team, taking into account the presentation, writing and clarity of ideas, structure and scientific level, creativity, justification of what it is discussed, critical thinking, richness of the criticism that is made, and suitability of the bibliography consulted.
- **Part 3.** Assessment of the degree of involvement and attitude of the students manifested in their active and reflective participation in the teaching sessions, seminars, consultations, exhibitions and debates, in the preparation of the works (individual or in teams), in the sharing sessions; as well as their attendance to classes, seminars, conferences, tutorials and group sessions.

Passing the subject requires passing the different parts of the evaluation independently, whose weights in the final grade are the following.

- **Part 1:** 50%;
- **Part 2:** 40%;
- **Part 3:** 10%.

The final grade in the subject obtained by each student under the continuous evaluation mode in the ordinary evaluation call is as follows.

If the student has taken the test or tests referred to in part 1:

- If the grade obtained in each of the three aforementioned evaluation parts is greater than or equal to 5 out of 10 points, the final grade is the weighted average of these grades;
- If the grade obtained in at least one of the evaluation parts is less than 5 out of 10 points, the final grade is the minimum of the grades obtained.

If the student has not taken the test or tests referred to in part 1, the final grade is "No show".

In the event of failing to pass any of the evaluation parts that make up the ordinary evaluation of



the subject, the student may take the extraordinary evaluation. Disambiguations of these grading criteria will be done, if necessary, by the corresponding teaching staff.

EXTRAORDINARY EXAMINATION DIET

The extraordinary evaluation of the subject aims to assess the significant learning of the students regarding the theoretical contents of the subject and its practical application, as well as the development of the expected competencies. In this evaluation call students will be evaluated through a written test with theoretical and practical parts, with weights in the final grade of 30% and 70% respectively.

The final grade in the subject obtained by each student in the extraordinary evaluation call is as follows.

If the student has taken the test:

- If the grade obtained in each of the parts is greater than or equal to 5 out of 10 points, the final grade is the weighted average of the grades obtained;
- If the grade obtained in at least one of the parts is less than 5 out of 10 points, the final grade is the minimum of the grades obtained.

If the student has not taken the test, the final grade is "No show".

Disambiguations of these grading criteria will be done, if necessary, by the corresponding teaching staff.

SINGLE FINAL ASSESSMENT (evaluación única final)

Those students who have been granted the single final evaluation according to the corresponding regulations (www.ugr.es/sites/default/files/2017-09/NCG1114.pdf) will be evaluated through a written test, with theoretical and practical parts, with weights in the final grade of 30% and 70% respectively. This test will assess their significant learning of the contents of the subject and their development of the expected competencies.

The final grade in the subject obtained by each student under the single final evaluation mode is as follows.

- If the grade in each of the parts is greater than or equal to 5 out of 10 points, the final grade is the weighted average of the grades obtained;
- If the grade obtained in at least one of the parts is less than 5 out of 10 points, the final grade is the minimum of the grades obtained.
- If the student has not taken the test, the final grade is "No show".

Disambiguations of these grading criteria will be done, if necessary, by the corresponding teaching staff.

ADDITIONAL INFORMATION

- This syllabus is subject to possible adaptations for students with recognised specific educational support needs (NEAE) in accordance with the reports provided by their corresponding NEAE tutors at the University of Granada and the regulations of the University of Granada: <https://www.ugr.es/sites/default/files/2017-09/NCG1114.pdf>.
- The content of the article 15 on the originality of the works and production in tests, included in the Regulations for Evaluation and Qualification of the students of the University of Granada



(<https://www.ugr.es/universidad/normativa/texto-consolidado-normativa-evaluacion-calificacion-estudiantes-universidad-granada>), is highlighted:

1. The University of Granada will promote respect for intellectual property and will transmit to students that plagiarism is a practice contrary to the principles that govern the University education. For this, it will proceed to recognise the authorship of the works and their protection in accordance with intellectual property as established by current legislation.
 2. Plagiarism, understood as the presentation of a work or work done by another person as one's own or the copying of texts without citing their origin and giving them as one's own elaboration, will automatically lead to a numerical grade of zero in the subject in which it was detected, regardless of the rest of the grades that the student would have obtained. This consequence must be understood without prejudice to the disciplinary responsibilities that students who plagiarize may incur".
- Link to single final evaluation request: <https://sede.ugr.es/procs/Gestion-Academica-Solicitud-de-evaluacion-unica-final>.
 - Link to request for evaluation due to incidents: <https://sede.ugr.es/procs/Gestion-Academica-Solicitud-de-evaluacion-por-incidencias>.

Información de interés para estudiantado con discapacidad y/o Necesidades Específicas de Apoyo Educativo (NEAE): [Gestión de servicios y apoyos \(https://ve.ugr.es/servicios/atencion-social/estudiantes-con-discapacidad\)](https://ve.ugr.es/servicios/atencion-social/estudiantes-con-discapacidad).

SOFTWARE LIBRE

LibreOffice, Maxima, GeoGebra, PSPP, etc.

