Approval date: **28/06/2023**

COURSE GUIDE

Design and Development of the Mathematics Curriculum in Primary Education (2561137)

Grado (Bachelor's Degree)	Grado en Educación Primaria (Bilingüe)	**Branch**	Social and Legal Sciences
Module	Enseñanza y Aprendizaje de las Matemáticas	**Subject**	Diseño y Desarrollo del Currículo de Matemáticas en Educación Primaria

Year of study	3º	**Semester**	2º	**ECTS Credits**	7	**Course type**	Compulsory course

PREREQUISITES AND RECOMMENDATIONS

It is recommended to have passed the subject "Mathematics bases in Primary Education" in the first year and "Teaching and Learning of Mathematics in Primary Education" in the second year.

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

Design and implementation of didactic units of mathematics in Primary Education. National Mathematics Curriculum for Primary Education. Aims of Mathematics Curriculum. Specification of the curriculum for the different grades of Primary Education. Mathematics classroom organization and management. Attitudes towards mathematics. Tools and strategies for assessment in mathematics. Attention to diversity, interdisciplinary topics in mathematics for Primary Education.

SKILLS

GENERAL SKILLS

- CG01 - Analizar y sintetizar la información
- CG02 - Organizar y planificar el trabajo
- 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
- CG12 - Desempeñar su trabajo con compromiso ético hacia sí mismo y hacia los demás
- CG13 - Investigar y seguir aprendiendo con autonomía
- CG14 - Innovar con creatividad
- 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
- CG24 - Diseñar, planificar, investigar y evaluar procesos educativos individualmente y en equipo
- CG27 - Diseñar y gestionar espacios e intervenciones educativas en contextos de diversidad que atiendan a la igualdad de género, la equidad y el respeto a los derechos humanos como valores de una sociedad plural
- 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
- 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

The main purpose of this subject is for students to deepen and apply their knowledge of Mathematics and the main dimensions for Mathematics Education, to design, support, and defend a didactic unit on a specific topic of Primary Education mathematics. This aim, which seeks to develop the planning competence of future teachers, is concretized in the following learning outcomes:

- Identify and characterize the basic structure of curricular documents in Spain and in the Andalusian Region, recognizing purposes, mathematical sense, key and specific competences, methodological guidelines and assessment criteria.
- Critically compare the main descriptors of curricular proposals from different countries.
- Establish and organize the sequence of mathematical topics in the different cycles of Primary Education.
- Determine and relate the main contents and procedures related to different mathematical topics.
- Collect and structure information related to the subjects of primary education mathematics according to different tools (representation systems, phenomenology, expectations, errors and difficulties, etc.).
- Design and sequence mathematical tasks according to specific content, certain learning expectations and the materials and resources available.
- Identify criteria and instruments for assessing school learning in mathematics and the development of basic math competence.
- Design and organize mathematical activities that motivate and promote the learning of all students, according to the requirements of today's society.
- Analyze and evaluate the organization and content of different textbooks, highlighting potentialities and shortcomings.
- Design and base a didactic unit for a specific topic of primary school mathematics.

PLANNED LEARNING ACTIVITIES

THEORY SYLLABUS

- Unit 1. Mathematics Curriculum. Structure and Elements. National and Regional Curricular Regulations. Other curricular approaches for Mathematics Teaching
- Unit 2. Classroom Management. Textbooks. Design, Selection, and Modification of Task Sequences
- Unit 3. Mathematics Assessment
- Unit 4. Planning for Teaching Mathematics in Primary Education
- Unit 5. Affective Aspects and Attention to Diversity in Teaching School Mathematics

PRACTICAL SYLLABUS

- Seminar 1. Analysis of the Spanish Curricular Regulation. Comparison of different curricular approaches
- Seminar 2. Analysis and Comparison of lessons in Mathematics Textbooks
- Seminar 3. Analysis and Modification of a School Mathematical Task.
- Seminar 4. Design of a Didactic Unit
- Seminar 5. Design of a one-hour mathematics lesson for Primary Education

RECOMMENDED READING

ESSENTIAL READING

- Abramovich, S. (2017). Diversifying Mathematics Teaching: Advanced Educational Content and Methods for Prospective Elementary Teachers. https://www.worldscientific.com/doi/epdf/10.1142/10361(Please use the VPN provided by the University of Granada)
- Alsina, À. (2019). Itinerarios didácticos para la enseñanza de las matemáticas (6-12 años). Grao.
- Blanco, L., Climent, N., González, M. T., Moreno, A., Sánchez-Matamoros, G., Castro, C. y Jiménez, C. (2022). Aportaciones al desarrollo del currículo desde la investigación en educación matemática. Universidad de Granada. https://editorial.ugr.es/ebook/131091/free_download/
- Castro, E. (Ed.) (2001).Didáctica de la matemática en Educación Primaria. Síntesis.
- Chamorro, C. (2003).Didáctica de las matemáticas para Primaria. Pearson-Prentice Hall.
- Chapin, S. H. & Johnson, A. (2006). Math Matters: Understanding the Math You Teach (2nd ed.). Math Solutions Publications.
- Dickson, L. Brown, M. & Gibson, O. (1991).El aprendizaje de las matemáticas. Labor.
- Flores, P. & Rico, L. (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. http://www.ugr.es/local/jgodino/.
- Godino, J. D. (Dir.) (2004).Matemáticas para maestros. Granada: Departamento de Didáctica de la Matemática. Universidad de Granada.http://www.ugr.es/local/jgodino.
- Junquera, J. (1961).Didáctica del cálculo. Labor
- NCTM (2003).Principios y estándares para la Educación Matemática. Sociedad Andaluza de Educación Matemática THALES.
- Posamentier, A. S. & Smith, B. (2020).Teaching Secondary School Mathematics: Techniques and Enrichment.World Scientific.
- Rico, L. (1997).Bases teóricas del currículo de matemáticas. Síntesis.
- Rico, L. (1997).La enseñanza de las matemáticas en Educación Secundaria. Horsori.
- Rico, L. y Moreno, A. (2016).Elementos de Didáctica de la Matemática para el profesor de Secundaria.Pirámide.
- Romberg, T. (1991).Estándares Curriculares y de Evaluación para la Educación Matemática. Sociedad Andaluza de Educación Matemática Thales.
- Segovia, I. y Rico, L. (Coord.) (2011):Matemáticas para maestros de Educación Primaria. Pirámide
- Smith, F. (2002).The glass wall: why mathematics can seem difficult.Teachers College Press.
- Van de Walle, J. A. (2001). Elementary and Middle School Mathematics. Teaching Developmentally (4th ed.). Longman
- Van de Walle, J. A., Karp, K. S., & Bay-William, J. M. (2013). Elementary and Middle School

Mathematics. Teaching Developmentally (8th ed.). Pearson.
- Van de Walle, J. A., Karp, K. S., & Bay-William, J. M. (2020). Elementary and Middle School Mathematics. Teaching Developmentally (10th ed.). Pearson.

COMPLEMENTARY READING

This bibliography is completed by current regulation for Spanish and Andalusian Primary Education, documents and specialized journals, as well as mathematics textbooks for the primary education of various publishers and their corresponding teacher guides. Additionally, the collection "Matemáticas: Cultura y Aprendizaje" [Mathematics: Culture and Learning] edited by Sintesis Publisher.

RECOMMENDED LEARNING RESOURCES/TOOLS

- http://nlvm.usu.edu/es/(Spanish)
- http://illuminations.nctm.org/(English)
- http://recursostic.educacion.es/descartes/web/(Spanish)
- https://intef.es/(Spanish)
- http://clic.xtec.cat/db/listact_es.jsp (Spanish)
- https://www.ugr.es/~jgodino/edumat-maestros/manual/9_didactica_maestros.pdf (Spanish)
- https://www.ugr.es/~jgodino/edumat-maestros/manual/8_matematicas_maestros.pdf (Spanish)
- https://www.geogebra.org/(Multilingual)

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 assessment of the level of acquisition of the competences will be continuous and formative, taking into account the aspects of the development of the subject, in which individual and group work is appreciated, and meaningful learning of the theoretical contents and their practical application. The overall rating will correspond to the weighted score of the different aspects and activities that make up the evaluation system:

- C1. Elaboration by groups of a didactic unit on a Mathematics topic of Primary Education and presentation and individual defense of it.
- C2. Evaluation of individual works or tests performed.

- C3. Realization and presentation of workshops done in group.
- C4. 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 pooling sessions. Class attendance, seminars, tutorials, group sessions will also be taken into account.

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

- C1: 40% (30% the final report + 10% individual defense)
- C2: 30%
- C3: 20%
- C4: 10%

The assessment of the development of skills and the degree of involvement and attitude of the students will be carried out using observation instruments. To issue these assessments, the teacher must have at least 80% observations of each student about their way of working, their commitment to the subject, their dedication or the skills student shows, among other things.
The assessment of the development of skills and the degree of involvement and attitude of the students will be carried out using observation instruments. To issue these assessments, the teacher must have at least 80% observations of each student about their way of working, their commitment to the subject, their dedication or the skills student shows, among other things. The methodological characteristics of the sessions require these observations to be made in small group sessions, which correspond to practical classes or seminars.
If a student had passed any of the criteria C1 or C3 that make up the ordinary evaluation of the subject, he or she must only pass the written tests that refer to the criteria not passed. In another case, that is, if the student has not passed any of the sections included in the ordinary evaluation, the student must pass one, or several, written, theoretical and practical exams corresponding to 100% of the final qualification. The final qualification must include the overcoming of the different tests.

EXTRAORDINARY EXAMINATION DIET

- C1. Elaboration of a didactic unit on a Mathematics topic of Primary Education and presentation and individual defense of it. Students must achieve the competence related to the design, planning, and assessment of mathematics teaching and learning. Percentage out of the final mark (40%, 30% the final report + 10% the individual defense)
- C2. Delivery of workshops done during the course. Students must achieve both the general and specific competencies related to the practical contents of the subject. Percentage out of the final mark (40%)
- C3. Evaluation of tests performed. Students must achieve both the general and specific competencies related to the theoretical contents of the subject. Percentage out of the final mark (20%).

The final Qualification should include the overcoming of the different criteria of the evaluation independently.

SINGLE FINAL ASSESSMENT (evaluación única final)

SINGLE FINAL ASSESSMENT (Artículo 8. Evaluación única final en convocatorias ordinaria y extraordinaria). According to the article 8 of the UGR regulations on students' evaluation and scoring (Normativa de evaluación y de calificación de los estudiantes de la Universidad de Granada)(link), if a student cannot follow the standard evaluation system set by the professor s/he has to apply electronically within the first two weeks of class to the head of the Department stating the reasons why that change is demanded.

- C1. Elaboration of a didactic unit on a Mathematics topic of Primary Education and

presentation and individual defense of it. Students must achieve the competence related to the design, planning, and assessment of mathematics teaching and learning. Percentage out of the final mark (40%, 30% the final report + 10% the individual defense)
- C2. Delivery of workshops done during the course. Students must achieve both the general and specific competencies related to the practical contents of the subject. Percentage out of the final mark (40%)
- C3. Evaluation of tests performed. Students must achieve both the general and specific competencies related to the theoretical contents of the subject. Percentage out of the final mark (20%)

The final Qualification should include the overcoming of the different criteria of the evaluation independently.
SPECIAL CIRCUMSTANCES EVALUATION (Artículo 9. Evaluación por incidencias). According to the article 9 of the UGR regulations on students' evaluation and score system (Normativa de evaluación y de calificación de los estudiantes de la Universidad de Granada), if a student cannot take any of the regular and/or extraordinary exams the date initially set by the professor, they will have to apply electronically to the head of the department for another date stating the reasons and including the necessary documentation that verify the argued circumstances.

ADDITIONAL INFORMATION

Following the indications contained in the Regulations for Evaluation and Qualification of students of the University of Granada (link),
We highlight what is stated in the article 15 on the originality of the works presented by the students:

1. The University of Granada will encourage respect for intellectual property and will convey to students that plagiarism is a practice contrary to the principles governing plagiarism University education. For this, it will proceed to recognize 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 own or the copy of texts without citing their origin and giving them as their own elaboration, will automatically lead to a global grade of zero in the subject in which the 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 in which students who plagiarize may incur.
3. The works and materials delivered by the students will have to be signed with an explicit declaration about the originality of the work, understood in the sense that he or she has not used sources without properly citing them.