

SUBJECT TEACHING GUIDE

G119 - Mathematics for Secondary Education

Double Degree in Physics and Mathematics

Degree in Mathematics

Degree in Mathematics

Academic year 2024-2025

| 1. IDENTIFYING DATA | | | | | |
|----------------------------------|---|------------------|--------------------|------------------|--------------------------------------|
| Degree | Double Degree in Physics and Mathematics Degree in Mathematics Degree in Mathematics | | | Type and Year | Optional. Year 5 Optional. Year 3 |
| Faculty | Faculty of Sciences | | | | |
| Discipline | Subject Area: Mathematics for Secondary Education Mention in Pure and Applied Mathematics | | | | |
| Course unit title and code | G119 - Mathematics for Secondary Education | | | | |
| Number of ECTS credits allocated | 6 | Term | Semester based (2) | | |
| Web | https://moodle.unican.es/course/view.php?id=3659 | | | | |
| Language of instruction | Spanish | English Friendly | No | Mode of delivery | Face-to-face |

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|------------------|---|
| Department | DPTO. MATEMATICAS, ESTADISTICA Y COMPUTACION |
| Name of lecturer | JOSE MANUEL DIEGO MANTECON |
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| Other lecturers | RAUL FERNANDEZ COBOS |

3.1 LEARNING OUTCOMES

- Connecting the mathematical contents of Secondary Education with the phenomena that originate them, recognizing the formal aspects involved together with its presence in everyday situations and those others that come from multidisciplinary fields (Physics, Biology, Economics, etc.).
- Recognizing the types of students' reasoning, proposing tasks that guide them, diagnosing their errors, and proposing the corresponding processes of intervention.
- Selecting and sequencing activities for school learning; analyzing the various problems that arise in learning situations
- Having specific criteria, techniques, and instruments for the evaluation of mathematical knowledge.
- Knowing resources and materials (computational, audiovisual, manuals, bibliographical, etc.) and using them properly in the teaching of Mathematics in Secondary Education.

4. OBJECTIVES

- Presenting idiosyncratic aspects of school mathematics and the problems derived from its teaching, complementing the formal vision that students have of it.
- Developing student professional skills related to the design of teaching mathematical content for Secondary Education
- Developing student commitment to training, and a critical and reflective attitudes towards Mathematics Education.

6. SUBJECT PROGRAM

| CONTENTS | |
|----------|--|
| 1 | Block 1: Introduction to Secondary Education, teaching planning and cultural perspective of mathematics teaching |
| 2 | Block 2: Learning mathematics: problem-solving strategies, errors and difficulties |
| 3 | Block 3: Learning approaches and resources |

| 7. ASSESSMENT METHODS AND CRITERIA | | | | |
|---|------|-------------|-----------|---------------|
| Description | Type | Final Eval. | Reassessn | % |
| Assessment activity related to blocks 1 and 2 (50%) | Work | Yes | Yes | 50,00 |
| Assessment activity related to block 2 (25%) | Work | Yes | Yes | 25,00 |
| Assessment activity related to block 3 (25%) | Work | Yes | Yes | 25,00 |
| TOTAL | | | | 100,00 |
| Observations | | | | |
| <ul style="list-style-type: none"> - Class participation will be valued. - The final mark for the subject will be the weighted average of the individual grades of each of the three assessment activities. Calculating the average mark will require a minimum of 4 points out of 10 in the assessment activity related to blocks 1 and 2. -The assessment activity related to blocks 1 and 2 will be defended through an oral presentation. - In the extraordinary call, all subject contents will be evaluated by means of a 'Final Exam'. | | | | |
| Observations for part-time students | | | | |
| For students enrolled under the part-time modality, the final mark will be the one obtained in the 'final exam'. | | | | |

8. BIBLIOGRAPHY AND TEACHING MATERIALS**BASIC**

- Boyer, C. B. (1986). Historia de la matemática. Alianza Universidad Textos.
- Diego-Mantecón, J. M., Haro, E., Blanco, T. F., & Romo-Vázquez, A. (2021). The chimera of the competency-based approach to teaching mathematics: a study of carpentry purchases for home projects. *Educational Studies in Mathematics*, 107(2), 339-357.
- Diego-Mantecón, J. M., Ortiz-Laso, Z., & Blanco, T. F. (2022). Reflexiones del Open STEAM Group sobre el Impacto Integrado del Contenido en el Aprendizaje de las Matemáticas. In T. F. Blanco, C. Núñez-García, M. C. Cañadas, & J. A. González-Calero (Eds.), *Investigación en Educación Matemática XXV* (pp. 81-94). SEIEM.
- Fauvel, J. y van Maanen, J. A. (2000). *History in mathematics education: An ICMI study*. The Netherlands: Kluwer Academic Publishers.
- Isturiz, M. P., Diego-Mantecón, J. M., Polo-Blanco, I., & González-López, M. J. (2019). Causas de los errores en la resolución de ecuaciones lineales con una incógnita. *PNA*, 13(2), 84-103. <http://doi.org/10.30827/pna.v13i2.7613>
- Kilpatrick, J., Rico, L. y Sierra, M. (1994). *Educación Matemática e Investigación*. Madrid: Editorial Síntesis.
- Ortiz-Laso, Z., & Diego-Mantecón, J.M. (2020). Strategies of Pre-Service Early Childhood Teachers for Solving Multi-Digit Division Problems. *Sustainability*, 12(23), 10217. <https://doi.org/10.3390/su122310217>
- Rico, L. y Moreno, A. (Eds.) (2016). *Elementos de didáctica de la matemática para el profesor de Secundaria*. Madrid: Pirámide.
- Rico, L. (Ed.) (1997). *La Educación Matemática en la Enseñanza Secundaria*. Barcelona: Editorial Horsori.
- Vinner, S. (1991). The role of definitions in the teaching and learning of mathematics. In D. Tall (Ed.) *Advanced mathematical thinking* (pp.65-80).Dordrecht: Kluwer Academic Press.