| Teaching Guide | | | | |
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| Identifying Data | | | | 2015/16 |
| Subject (*) | Investigación e innovación en didáctica da matemática | | Code | 652513221 |
| Study programme | Mestrado Universitario en Didácticas Específicas | | | |
| Descriptors | | | | |
| Cycle | Period | Year | Type | Credits |
| Official Master's Degree | 2nd four-month period | First | Obligatoria | 3 |
| Language | | | | |
| Teaching method | Face-to-face | | | |
| Prerequisites | | | | |
| Department | Pedagoxía e Didáctica | | | |
| Coordinador | Mato Vázquez, Mª Dorinda | E-mail | m.matov@udc.es | |
| Lecturers | Mato Vázquez, Mª Dorinda<br>Naya Riveiro, Maria Cristina | E-mail | m.matov@udc.es<br>cristina.naya@udc.es | |
| Web | | | | |
| General description | | | | |

| Study programme competences | |
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| Code | Study programme competences |
| A1 | To know the theoretical basis of interdisciplinary work and identify its centre of interest in school and non-school contexts. |
| A2 | To identify and critically analyse interdisciplinary proposals in the educational world. |
| A3 | To design, justify and evaluate in a systematic manner interdisciplinary proposals in different educational contexts. |
| A4 | To develop the linguistic competence in a foreign language oriented towards the teaching in specific subjects. |
| A5 | To acquire a methodological training to carry out educational research. |
| A6 | To stablish the general descriptors which conform a research project: to select, to develop, to deal with and interpret data and present results according to the purpose of the research. |
| A7 | - To be able to apply theoretical knowledge related to Specific Didactics, both in research as in innovation and evaluation. |
| A8 | To be able to defend and argue in oral and written ways the completed investigation and/or innovation work, using audio-visual aids. |
| A9 | To test and evaluate disciplinary and interdisciplinary teaching projects in real educational contexts and to promote suggestions for improvement related to the obtained results. |
| A10 | To know the theoretical basis which sustain research and innovation in the field of Specific Didactics. |
| A11 | To know and understand scientific language and use it correctly in different ways of expression and communication. |
| A12 | To identify the main research and innovation lines and their evolution in the area of Specific Didactics. |
| A13 | To analyse and critically assess research work and innovation projects in specific disciplinary fields. |
| A14 | To know the different types of methodologies used in educational research considering its appropriateness for problem-solving. |
| A15 | To identify quality and control criteria both in research and in the teaching practice, encouraging a critical, reflective and innovative spirit. |
| A16 | To design, justify and evaluate research and innovation projects in the field of Specific Didactics. |
| A17 | To select, adapt and apply materials, resources and ICTs to improve the teaching and learning in different disciplinary fields. |
| A18 | To acknowledge the research and innovation applied to Educational Sciences as a lifelong tool for innovation, educational and social improvement. |
| B1 | To have and understand general knowledge to establish foundations and /or opportunities to stand out in the development and implementation of ideas, mainly in an action- research context. |
| B2 | To be able to apply the acquired foundations and their problem-solving capabilities in new multidisciplinary contexts related to the specific research areas. |
| B3 | To be able to join contents and accept the challenge to formulate complex statements out of a limited or incomplete information, including reflections about social and ethic responsibilities related to the application of their own knowledge and opinions. |
| B4 | To be able to transfer and communicate their conclusions and opinions in a clear and straight manner both in a specialized and a non-specialized audience. |
| B5 | To have the required learning abilities to continue in a life-long-learning and autonomous process. |
| B6 | To be able to analyse and synthesize. |

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| B7 | To be able to adapt to new situations. |
| B8 | To work with initiative and in an autonomous way. |
| B9 | To work in a collaborative way. |
| B10 | To be able to organize and plan in curricular and cross-curricular subjects. |
| B11 | To be able to innovate (creativity) within educational and non-educational contexts. |
| B12 | to behave with ethics and with social and environmental responsibility as a teacher and/or researcher. |
| B13 | To be able to communicate with their peers, educational community and with society in general in the field of their areas of knowledge. |
| B14 | To incorporate ICTs for the research process, information management, data analysis and for transferability. |
| B15 | To be able to update knowledge, methodologies and strategies in their teaching practices |
| C1 | To express correctly, both orally and in written texts, in the two co-official languages of the Autonomous Community. |
| C2 | To express correctly, both orally and in written texts, in a foreign language (English). |
| C3 | To use the main ICT?s basic tools for their professional development and for their life-long-learning process. |
| C4 | To be able to self-develop for an open, critical, committed, democratic and solidary citizenship. |
| C5 | To understand the importance of the entrepreneurship culture and the available means for entrepreneurs. |
| C6 | To critically value available knowledge, technology and information to solve problems which students must face. |
| C7 | To assume as a professional and as a citizen the importance of life-long-learning. |
| C8 | To value the importance that research, innovation and technical developments have on society?s socio-economical and cultural progress. |

| Learning outcomes | | | |
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| Learning outcomes | Study programme competences | | |
| Conocer las principales metodologías, instrumentos y técnicas de investigación e innovación en didáctica de la matemática. | AJ2<br>AJ3<br>AJ5<br>AJ6<br>AJ12<br>AJ13<br>AJ17 | BJ1<br>BJ14<br>BJ15 | CJ3<br>CJ6<br>CJ8 |
| Aplicar los principios básicos de la investigación sobre el trabajo práctico en el análisis de procesos vinculados a la mejora de la competencia matemática. | AJ7<br>AJ8<br>AJ9<br>AJ10<br>AJ11<br>AJ12<br>AJ15 | BJ2<br>BJ3<br>BJ4<br>BJ5<br>BJ6<br>BJ8<br>BJ9<br>BJ13 | CJ1<br>CJ2<br>CJ5<br>CJ6<br>CJ7 |
| Conocer y analizar la importancia de los recursos didácticos para mejorar las actitudes hacia la matemática. | AJ11<br>AJ18 | BJ6<br>BJ7<br>BJ8<br>BJ9<br>BJ10<br>BJ11<br>BJ12<br>BJ14 | CJ3<br>CJ4<br>CJ6<br>CJ7<br>CJ8 |

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| Planificar investigaciones sobre problemas relacionados con la práctica, en consideración con los avances teóricos en el campo de conocimiento. | AJ1<br>AJ3<br>AJ4<br>AJ6<br>AJ13<br>AJ14<br>AJ15<br>AJ16<br>AJ17 | BJ6<br>BJ7<br>BJ8<br>BJ9<br>BJ10<br>BJ11<br>BJ12<br>BJ14 | CJ1<br>CJ5<br>CJ7<br>CJ8 |

| Contents | |
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| **Topic** | **Sub-topic** |
| Procesos de adquisición del conocimiento en matemáticas. | Procesos de adquisición del conocimiento en matemáticas. |
| Diseño y desarrollo de metodologías, instrumentos, técnicas, recursos para la enseñanza-aprendizaje de las matemáticas. | Diseño y desarrollo de metodologías, instrumentos, técnicas, recursos para la enseñanza-aprendizaje de las matemáticas. |
| Principios básicos de la innovación e investigación en educación matemática. | Principios básicos de la innovación e investigación en educación matemática. |

| Planning | | | | |
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| **Methodologies / tests** | **Competencies** | **Ordinary class hours** | **Student?s personal work hours** | **Total hours** |
| Document analysis | A2 A12 A15 B14 B15 | 0 | 10 | 10 |
| Collaborative learning | A8 A9 A13 A17 B2 B3 B8 B9 B12 C7 | 8.5 | 8.5 | 17 |
| Directed discussion | A7 B1 B4 B5 B7 B12 B13 C1 C2 C4 C6 C8 | 10 | 14 | 24 |
| Research (Research project) | A3 A4 A5 A6 A7 A16 A17 A18 B6 B8 B9 B10 B11 C3 C5 C8 | 0.5 | 18.5 | 19 |
| Oral presentation | A8 B3 B4 B6 B7 B8 B9 B13 C1 C2 | 0.5 | 1.5 | 2 |
| Introductory activities | A1 A10 A11 A14 | 2 | 0 | 2 |
| Personalized attention | | 1 | 0 | 1 |
| **(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.** | | | | |

| Methodologies | |
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| **Methodologies** | **Description** |
| Document analysis | Técnica metodolóxica que supón a utilización de documentos audiovisuais e/ou bibliográficos (fragmentos de reportaxes documentais ou películas, noticias de actualidade, paneis gráficos, fotografías, biografías, artigos, textos lexislativos, etc.) relevantes para a temática da materia con actividades especificamente deseñadas para a análise dos mesmos. Pódese empregar como introdución xeral a un tema, como instrumento de aplicación do estudo de casos, para a explicación de procesos que non se poden observar directamente, para a presentación de situacións complexas ou como síntese de contidos de carácter teórico ou práctico. |
| Collaborative learning | Conxunto de procedementos de ensino-aprendizaxe guiados de forma presencial e/ou apoiados con tecnoloxías da información e as comunicacións, que se basean na organización da clase en pequenos grupos nos que o alumnado traballa conxuntamente na resolución de tarefas asignadas polo profesorado para optimizar a súa propia aprendizaxe e a dos outros membros do grupo. |

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| Directed discussion | Técnica de dinámica de grupos na que os membros dun grupo discuten de forma libre, informal e espontánea sobre un tema, aínda que poden estar coordinados por un moderador. |
| Research (Research project) | Traballo extenso, realizado en grupo sobre un contido da materia. |
| Oral presentation | Exposición na aula do Proxecto de investigación. |
| Introductory activities | Actividades de evaluación inicial para comprobar os coñecementos previos dos estudantes. |

| Personalized attention | |
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| **Methodologies** | **Description** |
| Research (Research project)<br>Introductory activities<br>Collaborative learning<br>Directed discussion<br>Oral presentation | La atención personalizada se describe en torno a estas metodologías como momentos de trabajo presencial con el profesor por lo que se pide una participación obligatoria del alumno.<br>La forma y el momento en que se desarrollan se indicarán en relación a cada actividad a lo largo del curso según el plan de trabajo de la materia. |

| Assessment | | | |
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| **Methodologies** | **Competencies** | **Description** | **Qualification** |
| Research (Research project) | A3 A4 A5 A6 A7 A16 A17 A18 B6 B8 B9 B10 B11 C3 C5 C8 | Valorarase a metodoloxía, os resultados, a argumentación, as conclusións e a dificultade do tema elexido. | 55 |
| Collaborative learning | A8 A9 A13 A17 B2 B3 B8 B9 B12 C7 | Valorarase as comunicacións e a intervención na aula como o traballo diario e recollido na aula. | 30 |
| Oral presentation | A8 B3 B4 B6 B7 B8 B9 B13 C1 C2 | Valorarase a clararidade, a habilidade para presentar a información e a comunicación de resultados e conclusións. | 15 |

| Assessment comments |
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| A asistencia ás clases presenciais é obrigatoria.<br>Se ou estudante non chega a unha asistencia do 80% das clases presenciais será avaliado:<br>por unha proba individual (exame) que será un 50% da cualificación, eun traballo de investigación individual que será un 50% da cualifiación final.Tendo en conta que a cualificación mínima para que estas dúas partes compute na cualificación final sexa de 5. |

| Sources of information | |
|---|---|
| **Basic** | - Burghes, D. (Editor) (2012). Enhancing primary mathematics teaching and learning.. CfBT Education Trust. Plymouth, Uk.<br>- Castro Martínez, E.; Olmo Romero, Mª A.; Castro Martínez, E. (2002). Desarrollo del pensamiento matemático infantil. Departamento de Didáctica de la Matemática. Universidad de Granada, Granada.<br>- Godino, J.D. (2013). Actividades de iniciación a la investigación en Educación Matemática.. Uno. Revista de Didáctica de la Matemática, 63, 69-76.<br>- León Gómez, N.A. (2006). ¿Qué tan innovadores somos en Educación Matemática?. Números, 63, 49-57.<br>- Santos-Trigo, M. (2009). Innovación e investigación en Educación Matemática.. Innovación Educativa, vol.9, núm. 46, 5-13.<br>- Sivianes Valdecantos, S. (2009). El trabajo por proyectos y las matemáticas.. Números, 72, 75-80.<br>Se complementará a bibliografía ao longo do curso. |
| **Complementary** | |

| Recommendations |
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| **Subjects that it is recommended to have taken before** |

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| Subjects that are recommended to be taken simultaneously |
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| Subjects that continue the syllabus |
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| Other comments |
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(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.