



Teaching Guide				
Identifying Data			2020/21	
Subject (*)	Research and Innovation in Mathematics Teaching	Code	652513221	
Study programme	Mestrado Universitario en Didácticas Específicas			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	2nd four-month period	First	Optional	3
Language	SpanishGalician			
Teaching method	Face-to-face			
Prerequisites				
Department	Pedagogía e Didáctica			
Coordinador		E-mail		
Lecturers		E-mail		
Web	http://www.educacion.udc.es/index.php?pagina=table&id_titulacion=700			
General description	<p>Esta materia forma parte da optatividade do mestrado, e o obxectivo principal da materia é coñecer e traballar as diferentes metodoloxías que predomiñan na investigación e na innovación da didáctica da matemática.</p> <p>Está deseñada para traballar os diferentes contidos a través de diversas tarefas que se elaborarán e resolverán na aula.</p>			
Contingency plan	<ol style="list-style-type: none"> 1. Modifications to the contents 2. Methodologies <ul style="list-style-type: none"> *Teaching methodologies that are maintained *Teaching methodologies that are modified 3. Mechanisms for personalized attention to students 4. Modifications in the evaluation <ul style="list-style-type: none"> *Evaluation observations: 5. Modifications to the bibliography or webgraphy 			

Study programme competences / results	
Code	Study programme competences / results
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 establish 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.
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			
Learning outcomes	Study programme competences / results		
Aplicar os principios básicos da investigación sobre o traballo práctico na análise de procesos vinculados á mellora da competencia matemática.	AJ1	BJ6	CJ1
	AJ3	BJ7	CJ5
	AJ4	BJ8	CJ7
	AJ6	BJ9	CJ8
	AJ13	BJ10	
	AJ14	BJ11	
	AJ15	BJ12	
	AJ16	BJ14	
	AJ17		



Coñecer as principais metodoloxías, instrumentos e técnicas de investigación e innovación na didáctica da matemática.	AJ3 AJ7 AJ8 AJ9 AJ10 AJ11 AJ12 AJ15	BJ2 BJ3 BJ4 BJ5 BJ6 BJ8 BJ9 BJ13	CJ1 CJ2 CJ5 CJ6 CJ7
Coñecer e analizar a importancia dos recursos didácticos para mellorar as actitudes cara a matemática.	AJ11 AJ18	BJ6 BJ7 BJ8 BJ9 BJ10 BJ11 BJ12 BJ14	CJ3 CJ4 CJ6 CJ7 CJ8
Planificar investigaciónes sobre problemas relacionados coa práctica, concretamente cos avances teóricos no campo de coñecemento da didáctica da matemática.	AJ2 AJ3 AJ5 AJ6 AJ12 AJ13 AJ17	BJ1 BJ14 BJ15	CJ3 CJ6 CJ8

Contents	
Topic	Sub-topic
Procesos de adquisición do coñecemento en matemáticas.	Procesos de adquisición do coñecemento en matemáticas.
Deseño e traballo de metodoloxías, instrumentos, técnicas e recursos para o ensino-aprendizaxe das matemáticas.	Deseño e traballo de metodoloxías, instrumentos, técnicas e recursos para o ensino-aprendizaxe das matemáticas.
Principios básicos da innovación e investigación en educación matemática.	Principios básicos da innovación e investigación en educación matemática.

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	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	1.5	0.5	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	
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.
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 avaliación inicial para comprobar os coñecementos previos dos estudantes.

Personalized attention	
Methodologies	Description
Oral presentation Directed discussion Collaborative learning Introductory activities Research (Research project)	A atención personalizada descríbese en torno a estas metodoloxías como momentos de traballo presencial co profesor polo que se pide unha participación obrigatoria do estudante. A forma e o momento en que se traballen se indicará en relación a cada actividade ao longo do curso segundo o plan de traballo da materia. Aqueles estudantes con dispensa académica de exención de asistencia deberán comunicalo na primeira semán de clase e serán avaliados mediante un traballo (cunha ponderación do 50% na cualificación final) e unha proba individual (cunha ponderación do 50% na cualificación final), do mesmo xeito serán avaliados aqueles e aquelas que non cumpran un 80% de asistencia das sesións presenciais. A nota final será a media das cualificacións obtidas, solicitándose en cada unha delas para facer media unha nota igual ou superior a 5 puntos sobre 10 para superar a materia.

Assessment			
Methodologies	Competencies / Results	Description	Qualification
Oral presentation	A8 B3 B4 B6 B7 B8 B9 B13 C1 C2	Valorarase a claridade, a habilidade para presentar a información e a comunicación de resultados e conclusións.	15
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



Research (Research project)	A3 A4 A5 A6 A7 A16 A17 A18 B6 B8 B9 B10 B11 C3 C5 C8	<p>Valorarase a metodoloxía, os resultados, a argumentación, as conclusións e a dificultade do tema elexido.</p> <p>Os contidos incluídos deben estar apropiadamente referenciados ao longo do traballo e no apartado de referencias usando as normas APA (6ª Edición ou posterior se procede). O texto literal debe declararse usando ditas normas. No parafraseado debe figurar as fontes orixinais das ideas que se reelaboran. A presenza de fontes científicas no traballo é un signo de credibilidade que é un requisito imprescindible para demostrar a excelencia académica.</p> <p>Recoméndase consultar: http://www.udc.es/biblioteca/servizos/apoio_investigacion/servizos_apoio/publicar/citar.html</p> <p>Débese evitar o plaxio.</p> <p>As citas e as referencias a calquera texto debe declararse, o uso literal do texto ou ideas doutros autores parafraseadas sen declarar a fonte supón o suspenso do traballo en aplicación do artigo 14.4 da normativa académica de avaliacións, cualificacións e reclamación, aprobada polo Consello de Goberno do 19 de decembro de 2013 na que se indica que “na realización de traballos, o plaxio e a utilización de material non orixinal, incluído aquel obtido a través de internet, sen indicación expresa da súa procedencia e, se é o caso, o permiso do seu autor/a, poderá ser considerada causa de cualificación de suspenso na actividade”;</p>	55
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Assessment comments

A asistencia ás clases presenciais é obrigatoria.

Se o estudante non chega a unha asistencia do 80% das clases presenciais será avaliado:

- por unha proba individual (exame) que será un 50% da cualificación, e
- un traballo de investigación individual que será un 50% da cualificación final.

Tendo en conta que a cualificación mínima para que estas dúas partes compute na cualificación final sexa de 5.

Sources of information



<p>Basic</p>	<ul style="list-style-type: none"> - Godino, J.D. (2013). Actividades de iniciación a la investigación en Educación Matemática.. Uno. Revista de Didáctica de la Matemática, 63, 69-76. - Burghes, D. (Editor) (2012). Enhancing primary mathematics teaching and learning.. CfBT Education Trust. Plymouth, UK. - Castro Martínez, E.; Olmo Romero, M^a A.; Castro Martínez, E. (2002). Desarrollo del pensamiento matemático infantil. Departamento de Didáctica de la Matemática. Universidad de Granada, Granada. - León Gómez, N.A. (2006). ¿Qué tan innovadores somos en Educación Matemática?. Números, 63, 49-57. - Sivianes Valdecantos, S. (2009). El trabajo por proyectos y las matemáticas.. Números, 72, 75-80. - Santos-Trigo, M. (2009). Innovación e investigación en Educación Matemática.. Innovación Educativa, vol.9, núm. 46, 5-13. - Mato Vázquez, D.M. (2017). Aprender para enseñar matemáticas en Educación Infantil.. Madrid: Pearson Educación S.A. - Mato Vázquez, M.D. (2014). La afectividad hacia las matemáticas.. Createspaces: United States. Ball, D.L., Thames, M.H., Phelps, G. (2008). Content Knowledge for Teaching. What Makes it Special? Journal of Teacher Education, 59(5), pp. 389-407. Baumert, J., Kunter, M., Blum, W., Brunner, M., Voss, T., Jordan, A., Klusmann, U., Krauss, S., Neubrand, M., Tsai, Y.M. (2010). Teacher?s Mathematical Knowledge, Cognitive; Activation in the Classroom, and Student Progress. American Education Research Journal, 47(1), pp. 133-180. Hill, H., Ball, D.L., Schilling, S. (2004). Developing Measures of Teachers? Mathematical Knowledge for Teaching. The Elementary School Journal, 105(1), pp. 11-30. Lee, P. y Lee, N.H. (2009). Teaching Primary School Mathematics: A Resource Book, Singapore: Singapore Mathematics Education Series. Pons Parra, R.M.; Serrano González-Tejero, J.M. (2011) La adquisición del conocimiento: una perspectiva cognitiva en el dominio de las matemáticas. Educatio Siglo XXI, vol. 29, núm. 2. Os estudantes teñen á súa disposición multitude de recursos que completan estas referencias na plataforma Moodle.
<p>Complementary</p>	

Recommendations

Subjects that it is recommended to have taken before

Subjects that are recommended to be taken simultaneously

Subjects that continue the syllabus

Other comments

Recoméndase os envíos dos traballos telemáticamente e de non ser posible, non utilizar plásticos, elixir a impresión a dobre cara, empregar papel reciclado e evitar imprimir borradores.

Débese facer un uso sostible dos recursos e a prevención de impactos negativos sobre o medio natural.

Débese ter en conta a importancia dos principios éticos relacionados cos valores da sostenibilidade nos comportamentos persoais e profesionais

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