Universitat Autònoma de Barcelona

2021/2022

Research into Specific Ambits of Science and Mathematics Teaching

Code: 43929
ECTS Credits: 6

Degree	Type	Year	Semester
4313815 Research in Education	OT	0	1

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

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Use of Languages

Principal working language: catalan (cat)

Teachers

Maria Mercè Edo Basté

Josep Maria Fortuny Aymemí

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External teachers

2074410

Prerequisites

None

Objectives and Contextualisation

The goal of this module is to show and discuss different research perspective in science and math learning and teaching from early childhood to secondary education, as well as in the field of teacher training.

Competences

- Analyse data according to its nature and present results in accorance with the research proposals.
- Collect research data coherently in accordance with the chosen method.
- Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
- Communicate the research results, knowledge acquired and the implications for practice, and adapt the register to the public and formal protocols.
- Continue the learning process, to a large extent autonomously.
- Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.

- Plan research according to practice-related problems, taking into account theoretical advances in the field of knowledge.
- Recognise and relate the basic research principles in practical work for improvement in mathematic skill.
- Recognise and relate the basic research priniples in practical work for improvement in scientific competence.
- Recognise and relate the theoretical, empirical and social aspecys of the specific field of research.
- Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
- Use ICT in the research process, information search and management, data analysis and the dissemination and communication of results.
- Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
- Work in teams and with teams in the same or interdisciplinary fields.

Learning Outcomes

1. Analyse the theoretical frameworks of reference in order to establish those that guide the research.
2. Apply basic research principles in practical work to the analysis of processes related to improving science skills.
3. Apply the basic principles of research into problem-solving to the analysis of teaching-learning situations that target the improvement of mathematical competence.
4. Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
5. Continue the learning process, to a large extent autonomously.
6. Decide on the appropriate tools for analysis according to the nature of the data.
7. Decide on the information and the subjects involved in the study.
8. Design strategies for collecting information.
9. Find and analyse theoretical references.
10. Identify problem areas related to specific aspects of science and mathematics teaching and determine methodological approaches from which to address them.
11. Identify problems related to specific areas of science and mathematics teaching.
12. Identify theoretical reference points and evaluate their suitability for interpreting problem areas in science and mathematics teaching.
13. Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
14. Judge the theoretical and social importance of research into science and mathematics teaching.
15. Know the reference points in research associated with science and mathematics content domains.
16. Know the significant features of science- and mathematics-teaching research contexts and analyse them as objects of research.
17. Produce conclusions taking into reference the research objectives and questions and the theoretical references.
18. Recognise the theoretical standpoints on science and mathematics teaching and learning when planning research in this area.
19. Relate results in accordance with their origin (sources and instruments).
20. Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
21. Use ICT in the research process, information search and management, data analysis and the dissemination and communication of results.
22. Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
23. Work in teams and with teams in the same or interdisciplinary fields.
24. Write scientific summaries to be presented to different audiences.

Content

- Research on teaching and learning, and on teacher training, of biological and geological systems

- Research on teaching and learning, and in teacher training, of physical-chemical systems

- Research on teaching and learning, and in teacher training, of arithmetic and algebraic thinking

- Research on teaching and learning, and on teacher training, of geometric thinking

Methodology

The sessions will be based on the presentation of the main research theoretical framework and on the discussion of the results of research articles, as well as the analysis of data.

Our teaching approach and assessment procedures may be altered if public health authorities impose new restrictions on public gatherings for COVID-19

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Research results discussions and case analisys	0	0	1, 2, 3, 9, 16, 15, 6, 7, 8, 17, 11, 10, 12, 21, 14, 18, 24, 19, 23
Theoretical framework discussion	0	0	1, 2, 3, 9, 16, 15, 6, 7, 8, 17, 11, 10, 12, 21, 14, 18, 24, 19, 23

Assessment

The evaluation will be based on two individual tasks (50% each one)- During the first sessions the activities and the evaluation criteria will be specified. Deadline for submiting evaluation activities: March 24th.

Evaluation activities could be retaken (maximum grade 5).

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Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Individual actitity related with the theoretical framewoek	50	75	3	1, 2, 3, 9, 16, 15, 6, 7, 8, 17, 11, 10, 12, 21, 14, 13, 20, 4, 5, 18, 24, 19, 22, 23
Individual activity based on teaching materials	50	75	3	1, 2, 3, 9, 16, 15, 6, 7, 8, 17, 11, 10, 12, 21, 14, 18, 24, 19, 23

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Sauvé, L. (2010). Educación científica y educación ambiental: un cruce fecundo. Enseñanza de las Ciencias 28 (1), 5-18

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Enllaços web:

- Centre de Recursos per Ensenyar i Aprendre Matemàtiques (CREAMAT). Generalitat de Catalunya. http://phobos.xtec.cat/creamat/joomla/

- Freudental Institute. Utrecht (Nederlands). http://www.fisme.science.uu.nl/fisme/en/

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Software

No specific software will be used