Universitat Autònoma de Barcelona

2021/2022

Connections and Contexts in Mathematics

Code: 102060
ECTS Credits: 6

Degree	Type	Year	Semester
2500798 Primary Education	OT	4	0

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

Name: José Abraham de la Fuente Pérez
Email: JoseAbraham.DeLaFuente@uab.cat

Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Prerequisites

It is suggested that students who enroll in this course have taken and passed the subjects of the degree of Prima

" Matemàtiques per mestres " first year ,
" Aprenentatge de les matemàtiques i curriculum " seond year and
" Gestió i innovació a l'aula de matemàtiques " third year .

Objectives and Contextualisation

With the white light, Isaac Newton, he devised a plan to make it pass through a prism of glass revealed a beautiful rainbow that left astonished the experts of the Royal Society. This generated a direct question; white light is composed of all colors or was it the prism which colored it light? No more complexity than passing the multicolored light with an identical prism reversed the effect, returning to the vision of white light. This process was a bit more complex, but resolved the doubt.

In the same way that Sir Isaac, we spend many mathematical concepts through the prism of the education system, breaking it into different subjects. Instead, our students are not as demanding as the Royal Society and the first experiment have enough. The teachers expect students to be able to conclude the second prism but sometimes it not happens. Reality shows us that it is not an easy task and it is necessary to generate learning opportunities to develop.

In this course we learn to identify opportunities for learning in different contexts that lead us to practice using the second prism, connecting different subjects to work mathematical concepts more broadly.

To do this we will focus on practical models used in the classrooms of innovative schools: project work and work by corners, while developing the necessary evaluation tools.

So we learn to use tools to redirect this rainbow of material to a second prism, the interdisciplinary work.

OBJECTIVES:

- Identify, seize and create opportunities for learning mathematics in everyday situations or associated with other materials.
- Find, detect and connect activities, giving competence and interdisciplinary
- Analyze, design and create learning cooperative and interdisciplinary activities.
- Know, contextualize and practice activities connectorcharacter as work by corners or project work.
- Analyze, design and develop assessment tools for forming and competence activities.
- Guarantee a gender perspective and inclusive in the didactic productions.

Competences

- Analyse, reason and communicate mathematical proposals.
- Critically analyse personal work and use resources for professional development.
- Design and regulate learning spaces in contexts of diversity that take into account gender equality, equity and respect for human rights and observe the values of public education.
- Design, plan and evaluate education and learning processes, both individually and in collaboration with other teachers and professionals at the centre.
- Incorporate information and communications technology to learn, communicate and share in educational contexts.
- Know how primary schools are organised and about the diversity of actions involved in running them.
- Know the curricular areas of Primary Education, the interdisciplinary relation between them, the evaluation criteria and the body of didactic knowledge regarding the respective procedures of education and learning.
- Maintain a critical and autonomous relationship with respect to knowledge, values and public, social and private institutions.
- Stimulate and value effort, constancy and personal discipline in pupils.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
- Value the relationship between mathematics and sciences as one of the pillars of scientific thought.

Learning Outcomes

1. Adapt teaching and learning programs and activities to pupil diversity.
2. Analyse the goals of mathematics education at different stages of primary education.
3. Analyse the indicators of sustainability of academic and professional activities in the areas of knowledge, integrating social, economic and environmental dimensions.
4. Design innovative teaching sequences from contexts that provide recreational mathematics.
5. Design teaching and learning sequences that connect different mathematical topics.
6. Identify the social, economic and environmental implications of academic and professional activities within one?s own area of knowledge.
7. Identifying, designing and communicating concepts, facts and phenomena of different sciences capable of being modelled using mathematical concepts.
8. Propose viable projects and actions to boost social, economic and environmental benefits.
9. Propose ways to evaluate projects and actions for improving sustainability.
10. Understand recreational didactic situations involving mathematics, both inside and outside the classroom, to promote independent learning and cooperative work.

Content

1. The nose of teachers, detecting learning opportunities.
2. Separate and unify knowledge.
3. To link different mathematical concepts.
4. To link meanings of the same mathematical concept.
5. To link with other areas of knowledge.

6. Connect: Network.
7. From Reproduction to production.

Methodology

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

The protagonist in the educational process is the student and it is on this premise that has been planned methodology of the subject.As this is an optional subject , all the sessions will be done with the whole group class .

Still , as indicated in the methodology , there will be sessions where a small job in the classroom under the supervision of the teacher will be performed.

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			
Exhibitions by the teacher (BG)	20	0.8	2, 7
Type: Supervised			
Workshop analysis of didactic proposals (SG)	30	1.2	5
Workshop creation of didactic proposals (SG)	30	1.2	5
Type: Autonomous			
Project (BG)	20	0.8	2, 5, 7

Assessment

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

The evaluation of the course will take place throughout the academic year and it will be computed using the gradings of the following tasks:

- Microprojects I (individual) and II (group): developed during classroom sessions. There will be time reserved for group discussions. There will be between 5 and 6 microprojects. Passing all microprojects (with a mark of at least 5 out of 10) is mandatory. If any student obtains a mark below 5 they will have a 15 day period to redo the project and it will be assessed again.
- Video projects (group) - December 7th 2020: that consist of answering a researchable question using a 3 minute video. Passing this activity (with a mark of at least 5 out of 10) is also mandatory. If any student obtains a mark below 5 they will have a 15 day period to redo the project and it will be assessed again.
- Test (individual) - December 14th 2020: Voluntary test to be done in case one wants to have a mark above 8 out of 10. The test can be either oral or written, it will depend on the number of students that would want to take this test.

The student must take into account the assessment in policy considerations in the document: "Criteris i pautes generals d'avaluació de la Facultat de Ciències de l'Educació" (http://www.uab.cat/web/informacio- academic / AVALUACIO / rules-1292571269103.html)

As well as:

- In all activities the communicative competence will be taken into account, to the point that any activity can be returned if there are lack of expression or spelling.

- Attendance at the contact sessions of this course is mandatory, at least to 80% of them. In case the student does not attend to this mininum they will be considered as not presented. A student that does not hand in all assessment activities in the corresponding periods will also be considered as not presented.

- The note of group work is not necessarily the individual score of students in the group.

- The total or partial plagiarism of one of the activities and / or copy an assessment test is a direct reason for suspense of the subject.

- The marks obtained in each of the evaluation activities will be delivered tostudents within 15 days of its completion. Once delivered to the student may review and consultation on the schedule set by the teacher.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Microproyects I - individual	30%	17.5	0.7	1, 2, 10, 5, 4, 7
Microproyects II - group	30%	17.5	0.7	1, 3, 2, 10, 5, 4, 6, 7, 9, 8
Test - individual	20%	5	0.2	2
Video proyect - group	20%	10	0.4	3, 5, 6, 9, 8

Bibliography

Alsina, C. (1998). Mathematics and Cross-Curricular Activities. *Bridges Exist for Crossing them,* ZDM vol.30(2), p.34-36

Christiansen, I. M. (1998). *Cross-Curricular Activities Within One Subject? Modeling Ozone Depletion in 12*th *Grade*, ZDM vol.30(2), p.22-27

Corbalán, F. (2007). *Matemáticas de la vida misma*. Barcelona, Graó.

Gallego Lázaro, C. (2005). *Repensar el aprendizaje de las matemáticas :Matemáticas para convivir comprendiendo el mundo*, Barcelona, Graó.

Greeno, J. (1992). Mathematical and Scientific Thinking in Classrooms and Other Situations. *A:Enhancing Thinking Skills in the Sciences and Mathematics*, p.39-63.

Hughes-Hallett, D. (1998). *Interdisciplinary Activities in Mathematics and Science in the United States*, ZDM vol.30(4), p 116-118

Jorba, J.; Sanmartí, N. (1994). *Enseñar, aprender y evaluar: un proceso de regulación continua*, Madrid, Centro de Investigación y Documentación Educativa.

Lave, J., & Wenger, E. (1998). *Communities of Practice: Learning, Meaning, and Identity*, Cambridge University Press.

Michelsen,C., Glargaard, N. I Dejgaard, J. (2005), *Interdisciplinary Competences-Integrating mathematics and subjects of natural sciences*, M. Anaya, Canada.

Michelsen i B. Sriraman (Ed.), Proceedings of the 1st *International Symposium of Mathematics and its Connections to the Arts ans Sciences*, p 201-214

Sanmartí, N. (2007), *10 ideas clave. Evaluar para aprender*. Barcelona, Graó

Software

Geogebra

Scrath