

63223 - Instructional and Curricular Design in Mathematics

Syllabus Information

Academic year: 2023/24

Subject: 63223 - Instructional and Curricular Design in Mathematics

Faculty / School: 107 - Facultad de Educación

Degree: 584 - Master's Degree in Teaching Compulsory Secondary Education
593 - Master's Degree in Teaching, specializing in Mathematics

ECTS: 6.0

Year: 1

Semester: First semester

Subject type: Optional

Module:

1. General information

It provides the theoretical elements necessary to transform the official curriculum into a coherent program of activities and work in the classroom, both individually and in groups, giving priority to collaborative work and problem-based learning. In addition, it studies the theoretical foundations of instructional design on which the subjects of the Mathematics specialty that are taken in the following semester are based.

Objectives:

1. To know the different levels of concretion of the official mathematics curricula of Secondary Education, to analyse its prescriptive elements, establishing correspondences between them, and to acquire mechanisms for the elaboration of argued proposals of annual sequences of contents.
2. To know and analyse theoretical foundations of the didactics of mathematics that allow the design of learning sequences and to interpret the specific teaching and learning phenomena in the mathematics classroom.

SDGS 4,5 and 10. (<https://www.un.org/sustainabledevelopment/es/>)

2. Learning results

1. Describe the provisions of the official Spanish and Aragonese documents concerning the mathematics curriculum, as fundamental reference frameworks for the programming of this subject.
2. Critically comment on these provisions, situating the curricular and psychoeducational principles on which they are based, the choices they make and the margin of decision they leave for subsequent levels of curricular specification and adaptation.
3. Describe and analyse the different mathematics teaching-learning methodologies, placing them in the corresponding epistemological framework.
4. Recognize teaching-learning methodologies, assessing their relevance according to the conditions that present and, if necessary, adapting them to achieve more effective teaching.
5. Elaborate a basic proposal of annual sequencing of contents for a mathematics subject of the curriculum of ESO or Bachillerato.

Competencies: [CG03,CG04,CB9,CB10,CE34,CE35,CE36,CE40](#).

3. Syllabus

1. Educational purposes of teaching mathematics subjects in Secondary Education.
2. Curricular changes: the teaching of mathematics in the Secondary Education curricula of the LGE, LOGSE, LOE, LOMCE and LOMLOE.
3. Prescriptive and non-prescriptive elements of the official LOMLOE curriculum for mathematics subjects: specific

competencies, evaluation criteria, blocks of knowledge and meanings, teaching guidelines, didactic and methodological guidelines for ESO and Bachillerato, and the correspondences between them.

4. From curriculum design to didactic programming.
5. Epistemological and phenomenological foundations of mathematical content.
6. The usual didactic transposition.
7. Consequences for learning: difficulties and obstacles.
8. Problem solving and task acceptance as starting points for mathematical learning.
9. The school genesis of mathematical objects: generative issues and tasks that develop it.

4. Academic activities

The future teaching professional must develop a didactic action focused on problem solving and on the interaction of the student with their material and social environment. For this reason, the teaching offered in this subject is based on the same principles. In general, the master class will not have the traditional function of sequential presentation of contents, but will serve to anchor the contents, both mathematical and didactic, that have previously appeared in the practical classes, around the tasks of problem solving, case studies, etc.

Activities:

Practical face-to-face classes (active learning methodologies). The scripts will be handed in at the end of the session (evaluation activity B1).

Theoretical classes (lectures and discussion of papers).

Problem classes and case studies (elaboration of works). will be handed in to the teacher and will therefore have their weight in the final grade (evaluation activity B2).

Directed individual work (tutorials and elaboration of assignments).

During the theoretical sessions, students will receive indications for the realization of the individual directed work (evaluation activity C)

Additionally, the organization of conferences or seminars with guest speakers will be considered to facilitate the acquisition of the competences of the subject.

5. Assessment system

A. Individual written examination (30%) on the program.

B. Participation in practical classes and practical dossier (40%=30%+10%): B1) Group work related to face-to-face practices (30%). The degree of participation in the classes, the adequacy between the activities carried out and the reports presented, as well as the grammatical correctness and quality of the design of the dossier will be assessed. B2) Individual work linked to classes and that do not require additional classroom sessions (10%).

C. Individual directed work (30%). Elaboration and defence of an argued proposal of annual sequencing of contents for a Secondary mathematics subject, including its relation with aspects related to curricular elements such as competences and transversal elements, as well as with the methodological principles related to the instructional design of the subject. When evaluating, the overall coherence of the work, the adequacy to the indications of official curricular documents, the logical sequencing of the contents, the terminological precision of the concepts, theories and curricular models taken as reference, the expository clarity and the presentation will be taken into account.

Requirements to pass the subject, to obtain at least:

- 1) 1 point out of 3 in A,
- 2) 1 point out of 3 in C,
- 3) 5 points out of 10 in A+B+C

If any requirement is not met, the grade will be the minimum between 4 points and A+B+C.

The global test and second call will consist of:

activities A and C above, and the individual realization of a report evaluating the quality of a design of a sequence of learning activities, based on the criteria developed in the analysis of the different models, theories and principles, and proposing improvements (40%)

Requirements to pass the subject, to obtain at least:

- 1) 1 point out of 3 in A,

2º)1 point out of 3 in C,

3º)5 points out of 10 in A+C+individual report

If any requirement is not met, the grade will be the minimum between 4 points and A+C+individual report

For the second call, the student may keep all or some of the A or C grades

Fifth and Sixth calls: For the evaluation of students in this situation, the evaluation criteria and requirements indicated above are applied depending on whether it is the first or second call of the school year.

Finally, it must be taken into account that the Regulations of the Norms of Coexistence of the University of Zaragoza will be applicable to the irregularities committed in the evaluation tests by means of academic fraud, as well as the application of article 30 of the Regulations of the Norms of Evaluation of Learning in relation to irregular practices other than academic fraud.