Universitat Autònoma de Barcelona

2023/2024

Teaching Biology and Geology

Code: 44311
ECTS Credits: 15

Degree	Type	Year	Semester
4310486 Teaching in Secondary Schools, Vocational Training and Language Centres	OT	0	A

Contact

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Teaching groups languages

You can check it through this link. To consult the language you will need to enter the CODE of the subject.
Please note that this information is provisional until 30 November 2023.

Teachers

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Prerequisites

No requirements

Objectives and Contextualisation

The aim of the subject is to bring future science teachers closer to the knowledge of science teaching, and to the specific didactics of each discipline. So that they can teach the contents of the areas of knowledge of biology and geology and physics and chemistry, integrating disciplinary knowledge and those of science teaching taking into account the knowledge of other areas such as the 'epistemology, language and communication, psychology and pedagogy.

Includes 2 blocks: Learning and teaching Biology and Geology (9cr) and Teaching innovation and Introduction to Biology and Geology Education Research (6 cr)

Competences

- "Design and conduct formal and no-formal activities that help make the center a place of participation and culture in the environment where it is located; develop the functions of mentoring and guiding students in a collaborative and coordinated manner; participate in the evaluation, research and innovation in teaching and learning"
- "Determine the curriculum that will be implanted in a school participating in the collective planning thereof; develop and implement both group and personalized teaching methodologies adapted to the diversity of students."
- Acquire strategies to encourage student effort and enhance their capacity to learn by himself and others, and develop thinking skills and decision-making to facilitate autonomy, confidence and personal initiative.
- Communicate effectively both verbally and non-verbally.
- Design and develop learning spaces with special attention to equity, education and emotional values, equal rights and opportunities for men and women, civic education and respect for human rights that facilitate life in society, decision making and building a sustainable future.
- Generate innovative and competitive professional activities and research.
- Interpret the different educational needs of students in order to propose the most appropriate educational activities.
- Know the curricular content of the matters relating to the appropriate teaching specialization and the body of didactic knowledge around the respective teaching and learning.
- Make effective use of integrated information and communications technology.
- Own the learning skills necessary to carry out continuous training, both in content and teaching specialty, as in the general aspects of teaching.
- Plan, develop and evaluate the teaching and learning process enhancing educational processes that facilitate the acquisition of the competences of the respective teachings, based on the level and previous training of students as well as the orientation of the same, both individually and in collaboration with other teachers and school professionals
- Search, obtain, process and communicate information (oral, printed, audiovisual, digital or multimedia), transform it into knowledge and apply it in the teaching and learning in their own areas of specialization.
- know the processes of interaction and communication in the classroom, mastering social skills and abilities necessary to encourage learning and coexistence in the classroom, and address problems of discipline and conflict resolution.

Learning Outcomes

1. Communicate effectively, both verbally and non-verbally.
2. Create a climate that facilitates interaction and values the contributions of students to promote the learning of Biology and Geology in the classroom.
3. Demonstrate knowledge and applies resources and information strategies, tutoring and academic guidance professional.
4. Demonstrate knowledge and knows how to apply innovative teaching proposals in the Biology and Geology fields.
5. Demonstrate knowledge of contexts and situations in which they are used and Biology and Geology that composen the curriculum of Compulsory Secondary Education and Baccalaureate apply, highlighting its functional character and analyzing his impact on the current world.
6. Demonstrate knowledge of cultural and educational value of Biology and Geology and the contents of these disciplines taught in Secondary Education and Baccalaureate, and integrate this content in the framework of science and culture.
7. Demonstrate knowledge of the Biology and Geology curricula in the Secondary School and Baccalaureate.
8. Demonstrate knowledge of the history and recent developments in Biology and Geology and his perspectives to convey a dynamic view of the same and make sense of the Biology and Geology School, highlighting the historical genesis of knowledge of both sciences.
9. Demonstrate knowledge of the theoretical and practical developments in teaching and learning of Biology and Geology.
10. Design and develop learning spaces with special attention to equity, education and emotional values, equal rights and opportunities between men and women, civic education and human rights that facilitate life in society, decisions and building a sustainable future.
11. Generate innovative and competitive proposals for research and professional activities.

12. Interpret the different educational needs of students in order to propose the most appropriate educational activities.
13. Know the processes of interaction and communication in the classroom, mastering social skills and abilities necessary to encourage learning and coexistence in the classroom, addressing issues of discipline and conflict resolution.
14. Possess learning skills necessary to carry out continuous training in both content and didactics of Health, as well as general aspects of teaching.
15. Search, obtain, process and communicate information (oral, printed, audiovisual, digital or multimedia) to transform it into knowledge and apply it in the teaching-learning materials specific to the specialization studied.
16. Select, use and develop materials for teaching Biology and Geology.
17. Transform the curricula of Biology and Geology in sequences of learning activities and programes of work.
18. Understand the evaluation as an instrument of regulation and to encourage the effort, and meet and develop strategies and techniques for the assessment of learning of Biology and Geology.
19. Use information and communications technology and integrate them into the teaching and learning of Biology and Geology.

Content

BIOLOGY AND GEOLOGY DIDACTICS

The block "Biology and Geology didactics" is divided into 2 parts: "Learning and teaching Biology and Geology " (9cr) and "Teaching innovation and introduction to research in Biology and Geology didactics" (6cr).

Learning and teaching Biology and Geology (9cr)

Introduction to Science Education (3cr)

- Purpose of teaching science at ESO

- The teaching of science and development of scientific competence

- What is science? Reflections on the epistemology of science

- What science should be taught in school?

- Didactic models and preconceptions

- The learning cycle and activities

- Assessment and regulation of learning

Biology Didactics (3cr)

- Biology Didactics (3cr)

- Models (living thing, cell, ecosystem, genetics and evolution and key concepts in school biology What and why.

- Selection and sequencing of content to teach.

- Learning scenarios and resources

- Previous ideas and learning difficulties related to big ideas and proposals for overcoming them.

Geology Didactics (3cr)

- Models and key concepts in school geology. What and what for.

- Selection and sequence of contents to teach.

- Learning scenarios and resources.

- Misconceptions and learning difficulties related to the great ideas and ways to overcome them.

- Modelling, inquiry and argumentation in school Earth Science.

- Earth Science practical activities

- Earth Sciences relation to the other Experimental Sciences.

Teaching innovation and introduction to research in Biology and Geology (6 cr)

Teaching innovation

- The curriculum. Learning objectives, programming and evaluation.

- Diversity of types of competence teaching units according to the approach: progressions, projects, inquiry, ABP, modelling etc.

- Contexts and knowledge transfer.

- The development of transversal skills: critical thinking, cognitive-linguistic, digital, self-regulation, etc.

Introduction to Biology and Geology Education Research

- Reflective practice: reflection on practice and its relationship to educational innovation

- The classroom observation: goals, models of observation and instruments

- Methodological bases for innovation and educational research

Methodology

The hours indicated for each of the training activities are indicative and can be modified slightly depending on the schedule or the teaching needs.

In classroom activities, students will be proposed to work in small groups to promote the maximum participation of all students.

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			
Assistència i participació a les classes magistrals, pràctiques de laboratori, sortides, etc, i la realització i avalaució d'activitats relacionades	97.5	3.9	15, 1, 13, 5, 6, 7, 9, 3, 4, 8, 10, 18,

			11, 12, 16, 17, 19
Type: Supervised			
Revisió, realització i avaluació de treballs (informes, estudis de cas, resolució de problemes, exposicions, pràctiques de laboratori, treballs de camp, ...)	75	3	15, 1, 13, 5, 6, 7, 9, 3, 4, 8, 10, 18, 11, 12, 16, 17, 19
Type: Autonomous			
Anàlisis de lectures i propostes d'innovació didàctica, realització d'informes, disseny d'activitats, anàlisis i resolució de casos	202.5	8.1	15, 1, 13, 5, 6, 7, 9, 3, 4, 8, 10, 18, 11, 12, 16, 17, 19

Assessment

Continuos Assessment

Attendance at the sessions is recommended to ensure the monitoring of the subjects and to carry out tasks or activities on site. Attendance in a percentage greater than or equal to 80% together with an attitude of active listening and respectful participation is a requirement for the ordinary evaluation of the subject.

To pass the module is necessary to have passed each of the blocks of content and each of the themes that shape and can still be made independently

Summative evaluation of each of the themes of each block includes group activities and individual activities. To make media should take at least 4 of each of the planned activities to be evaluated and that teachers previously indicated.

Throughout the module part of each teacher / a imparts, you can ask additional tasks without having to be necessarily considered assessment tasks, but delivery obligations.

Delivery of work is primarily done via the virtual campus. They may enable other routes of delivery, in agreement with the teachers, informed via attendance in class and via virtual.o moodle campus. No work delivered by way not agreed with the teacher / a nor work with incorrect formats, which do not include the names of the authors and subject matter to which they refer or sent after the deadline will be accepted.

Since the lingua franca of the master and secondary education is Catalan, oral and written tasks related to this module will be presented in this language. In written tasks, linguistic correction, composition skills and formal presentation aspect will be considered. Nevertheless, it is necessary to express yourself with fluency and correction in oral activities. A prominent level of comprehension of academic documents will also be required. An activity may not be assessed, not given back or failed if any of the mentioned requirements are not accomplished.

Work and examinations will be assessed at most one month after delivery or performance.

According to the regulations UAB, plagiarism or copying of any workwill be penalized with a 0 rating, losing the ability to recover, whether it is an individual work and group (in this case, all group members will have a 0).

Introduction to Science Education

- Personal reflection in relation to an ideal science class.50%. Delivery date: the document is done the first day of the master and students' will reflect on it the last day of the teaching.

- Suggestion of a competency question for assessment purposes 50%. Delivery date: 3/11/2023

Teaching innovation and introduction to research in Phisics and Chemistry didactics

- Design of an activity 50% Delivery date: 12/01/2024

- Design of a proposal ABP 30% (group work). Delivery date: 17/05/2024

Biology Education

Individual task: Throughout the course all students will perform a microteaching, ie a small classroom intervention where they will have to act as teachers to the rest of the group and implement a teaching activity designed for the occasion. Once the microteaching has been carried out, each student must prepare a written text that includes sufficient evidence of learning during the process of preparation (pre), implementation and reflection (post) of the microteaching: identifying own mistakes, proposing improvements, applying- to new contexts, relating it to didactic concepts learned during the course, etc. Therefore, the quality of the implementation of microteaching itself will not be qualifiable, but doing so is a prerequisite for preparing the subsequent reflection paper for the final individual qualification. Delivery: 17/02/2024. Recoverable task.

Geology Education

Individual task: Throughout the course all students will perform a microteaching, ie a small classroom intervention where they will have to act as teachers to the rest of the group and implement a teaching activity designed for the occasion. Oncethe microteaching has been carried out, each student must prepare a written text that includes sufficient evidence of learning during the process of preparation (pre), implementation and reflection (post) of the microteaching: identifying own mistakes, proposing improvements, applying- to new contexts, relating it to didactic concepts learned during the course, etc. Therefore, the quality of the implementation of microteaching itself will not be qualifiable, but doing so is a prerequisite for preparing the subsequent reflection paper for the final individual qualification. Delivery: 17/02/2024. Recoverable task.

Unique assessment

Students who take the single assessment of the module must deliver all the tasks described above by 17/05/2024.
The weight of the activities will be the same than in the continuous evaluation.

Reassessment

Whether the one-time or continuous assessment optionis chosen, recoverable activities must be submitted 15 days after receiving the assessment. The new activity must be accompanied by a document justifying the changes made.

The maximum mark for the recovered activities is a 5.

To pass this subject, the student needs to show good general communication skills, both orally and in writing, and a good command of the language or vehicular languages listed in the teaching guide.

In all activities (individual and group), linguistic correction, writing and formal aspects of presentation will therefore be taken into account. Students must be able to express themselves fluently and correctly and must show a high degree of understanding of academic texts. An activity can be returned (not evaluated) or suspended if the teacher considers that it does not meet these requirements.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Evaluation of Biology Education	20%	0	0	15, 1, 13, 5, 6, 7, 9, 3, 4, 8, 10, 18, 11, 12, 16, 17, 19
Evaluation of Geology Education	20%	0	0	15, 1, 13, 5, 6, 7, 9, 3, 4, 8, 10, 18, 11, 12, 16, 17, 19

Evaluation of Innovation and Research in Education	40%	0	0	15, 1, 13, 2, 5, 6, 7, 9, 3, 4, 8, 10, 18, 11, 12, 14, 16, 17, 19
Evaluation of Introduction to Science Education	20%	0	0	15, 1, 7, 9, 3, 8, 18

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DOMÈNECH, Jordi (2022) Mueve la lengua, que el cerebro te seguirá. 75 acciones lingüísticas para ensñar a pensar Ciencias. Graó: Barcelona

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Official documents

Curriculum secundària www.xtec.cat

https://documents.espai.educacio.gencat.cat/IPCNormativa/DOIGC/CUR_ESO.pdf

Informe PISA http://www.gencat.net/educacio/csda/publis/quaderns.htm

Enseñanza de las Ciencias Magazine

Alambique. http://alambique.grao.com

Ciències: Revista del Professorat de Ciències d'Infantil, Primària i Secundària. http://crecim.uab.cat/revista_ciencies/revista/index.htm

Enseñanza de las Ciencias. Revista de Investigación y Experiencias Didácticas. http://www.raco.cat/index.php/ensenanza

Eureka: http://revistas.uca.es/index.php/eureka

Curricular Projects

IZQUIERDO, M. (Coord.). (1993), Ciències 12-16. CDEC. Generalitat de Catalunya

Projecte Advancing Phisics. IOP. http://advancingphysics.iop.org/

Projecte 21st Century Science. The University of York & Nuffield Foundation. http://www.21stcenturyscience.org/

Projecte Física i Química Salters i Salters Horners. The University of York, Nuffield Foundation, Salters Institute and Horners Co.

Salters Advanced Chemistry www.salters.co.uk/institute/curriculum_advanced.html

Salters Horners Advanced Physics www.salters.co.uk/institute/curriculum_horners.html

Disponible en català a: http://www.xtec.es/cdec/formacio/pagines/salters_f.htm

Projecte IDEAS, Nuffield Foundation & School of Education, Kings' CollegeLondon.

Original: www.kcl.ac.uk/schools/sspp/education/research/projects/ideas.html

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Webgrafia

Aplicació de recursos al currículum

Web del departament d'Ensenyament on trobar activitats,indexades per tema i curs

http://apliense.xtec.cat/arc/

Webs d'en Jordi Domènech

Webs amb molts recursos per treballar a l'aula

https://jordidomenechportfolio.wordpress.com/

https://sites.google.com/a/xtec.cat/c3/ciencia-llengua-i-comunicacio

CESIRE

Web del Centre de Recursos Pedagògics Específics de Suport a la Innovació i la Recerca Educativa. Hi trobareu recursos, informacions, cursos de formació, material en préstec, etc.

http://www.xtec.cat/web/innovacio/cesire

Nuffield foundation

La Nuffield Foundation és una fundació inglesa fundada el 1943 pel fundador de la Morris Motors amb l'objectiu de millorar el benestarsocial. Financien recerca i innovació en educació i polítiques socials. Hi trobareu molt recursos d'activitatsi projectes.

http://www.nuffieldfoundation.org/science-education#1

Science web Australia

Web amb activitats diverses.

http://scienceweb.asta.edu.au/

http://www.arkive.org/education/

Software

No specific programs needed