

Degree	Type	Year
Formación de Profesorado de Educación Secundaria Obligatoria y Bachillerato, Formación Profesional y Enseñanza de Idiomas	OP	1

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Teaching groups languages

You can view this information at the [end](#) of this document.

Prerequisites

No requirements

Objectives and Contextualisation

The aim of this course is to introduce future science teachers to the specific didactics of each discipline, while also exploring the historical development of scientific theories and how these subjects are presented within the upper-secondary (Baccalaureate) curriculum.

The course is organized into four main modules:

- Biology Didactics - 5 ECTS
- Geology Didactics - 5 ECTS
- History of Science - 2 ECTS

- In-depth Study of the Biology and Geology Curriculum in the Baccalaureate - 3 ECTS

Learning Outcomes

1. CA12 (Competence) Create exemplary learning situations that promote inclusive competency-based learning in biology and geology, including experimental activities, construction of explanations, field trips, socio-scientific debates and scientific reading and writing, among others.
2. CA13 (Competence) Apply the key aspects of educational and training assessment integrated into paradigmatic examples of the assessment of learning in biology and geology.
3. CA14 (Competence) Demonstrate the digital teaching competence of science teachers, including the appropriate use of simulations, real-time sensors and remote biology and geology laboratories, among others.
4. KA09 (Knowledge) Describe situations with potential for improvement in the self-observation and co-observation of teaching and learning situations in biology and geology, whether face-to-face or video, both in real and simulated classrooms, identifying positive and problematic key aspects from the perspective of science teaching.
5. KA10 (Knowledge) Remember the curricular contents of biology and geology, as well as the body of teaching knowledge around the respective teaching and learning processes.
6. SA14 (Skill) Base the teaching action of design, implementation and evaluation of competency-based learning activities and situations on the knowledge and strategies of science and biology and geology teaching.
7. SA15 (Skill) Apply the disciplinary contents and the secondary education biology and geology curriculum from a literacy and educational vision for society as a whole.
8. SA16 (Skill) Evaluate scientific and educational information from the perspective of critical thinking applied to the teaching of biology and geology, including the mastery and application of knowledge specific to the area of research in science teaching.

Content

Biology Didactics (5 ECTS)

- The aims of teaching Biology. The role of Biology in the contemporary world.
- Key models (living organisms, the cell, ecosystems, genetics, and evolution) and core concepts in school biology: what to teach and why.
- Selection and sequencing of teaching content.
- Learning environments and teaching resources.
- Students' prior conceptions and common learning difficulties related to key ideas, with strategies to address them.

Geology Didactics (5 ECTS)

- The aims of teaching Geology. The role of Geology in the contemporary world.
- Key models and core concepts in school geology: what to teach and why.
- Selection and sequencing of teaching content.
- Learning environments and teaching resources.
- Students' prior conceptions and common learning difficulties related to key ideas, with strategies to address them.

- Modeling, inquiry, and argumentation in Earth Sciences.
- The role of practical work in Earth Sciences.
- Connections between Earth Sciences and other experimental sciences.

In-depth Study of the Biology and Geology Curriculum in the Baccalaureate (3 ECTS)

Biology Curriculum

- Life; biomolecules and water.
- Genetics and the cell cycle.
- Metabolism.
- Evolution.
- Biotechnology.

Geology Curriculum

- The Earth system and its subsystems: modeling of the atmosphere, hydrosphere, geosphere, biosphere, and pedosphere.
- Isoline maps: topographic maps and profiles, slopes and surfaces, isobar maps and weather forecasting.
- Geological maps and cross-sections; interpreting Earth's geological history.
- Rocks: rock mechanics, hydrogeological behavior, mass movements.
- Humans and geology: resources, impacts, and natural hazards.

History of Science (2 ECTS)

1. What is science? Where is history?
2. Gravity: from *physis* to relativity.
3. The evolution of life and the Earth.
4. Radioactivity and the transmutation of matter.
5. Workshop: Chaos, order, and dinosaurs.
6. Workshop: Meitnerheimer.
7. Workshop: The individual, information, and society.
8. Workshop: Chaos, order, and dinosaurs.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
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Type: Directed

Assistència i participació a les classes magistrals, pràctiques de laboratori, sortides, etc, 97.5 3.9
i la realització i avaluació d'activitats relacionades

Type: Supervised

Revisió, realització i avaluació de treballs (informes, estudis de cas, resolució de problemes, exposicions, pràctiques de laboratori, treballs de camp, ...)

75 3

Type: Autonomous

Anàlisi de lectures i propostes d'innovació didàctica, realització d'informes, disseny d'activitats, anàlisi i resolució de casos

202.5 8.1

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.

Assessment

Continuous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Bachelor Biology and Geology Evaluation	25%	0	0	CA14, KA10, SA15
Biology Education Evaluation	30%	0	0	CA12, CA13, CA14, KA09, KA10, SA14, SA15, SA16
Evaluation of Geology Education	30%	0	0	CA12, CA13, CA14, KA09, KA10, SA14, SA15, SA16
History of science evaluation	15%	0	0	CA14, KA10, SA15, SA16

Continuous Assessment

The Master's in Secondary Education at UAB is delivered in face-to-face format, as classroom activities-together with attentive listening and active participation-are considered essential for learning.

To obtain a final average grade, students must achieve at least a mark of 4 in each of the assessed activities. Work not submitted by the established deadline and in the required format will receive a grade of 0.

Throughout each professor's part of the module, additional tasks may be required. These are compulsory but will not necessarily be graded.

All assignments must be submitted via the virtual campus. Submissions sent through non-agreed channels, in incorrect formats, without the authors' names, without reference to the topic, or submitted after the deadline will not be accepted.

Biology Didactics (30% of the module grade)

- Individual task: During the course, all students will carry out a *microteaching*, i.e., a short classroom intervention where they act as teachers for the rest of the group and implement a didactic activity designed for the occasion. The microteaching itself is not graded, but completing it is a prerequisite for writing the subsequent reflection paper, which forms the basis of the individual assessment.
 - Submission: 15 days after the end of the module
 - Non-recoverable
 - Weight: 15%
- Design of a classroom activity focused on teaching a specific key concept. This activity must differ from the one used in the microteaching and from the unit taught during the practicum. Individual task.
 - Submission: 15 days after the end of the module
 - Recoverable
 - Weight: 15%

Geology Didactics (30% of the module grade)

- Individual task: Students will also complete a *microteaching* session, under the same conditions as in Biology Didactics (non-graded implementation, but required for the reflective paper).
 - Submission: 15 days after the end of the module
 - Non-recoverable
 - Weight: 15%
- Design of a classroom activity for teaching a specific key concept, different from the microteaching and the practicum unit.
 - Submission: 15 days after the end of the module
 - Recoverable
 - Weight: 15%

History of Science (15% of the module grade)

- Submission of a short essay (600 words) on one of the sessions. Individual task.
 - Deadline: 28/11/2025
 - Recovery: students may submit a new 600-word essay on another session. To be eligible, the first essay must have been submitted. Maximum weight for recovery: 80%.

In-depth Study of the Biology and Geology Curriculum in the Baccalaureate (25% of the module grade)

- Completion of one exam-style activity (*PAU format*) for each discipline. The final grade will be the weighted average of the two tasks. Individual task.
 - Deadline: last day of class for each discipline
 - Recoverable in person on 28/05/2026

Non continuous Assessment

Students who opt for single assessment must submit all the above tasks by 14/05/2026. On this date, they will also be required to complete the *microteaching* and the assessment activities related to the in-depth study of the Baccalaureate curriculum.

The single assessment covers the same aspects as continuous assessment.

Resits

Whether students follow continuous or single assessment, recoverable activities must be resubmitted within 15 days of receiving feedback, together with a document justifying the changes made. The maximum grade for resubmitted activities is 5/10.

Students who have submitted at least two-thirds of the tasks with a minimum average grade of 3.5 may resubmit failed tasks on 28/05/2026. On this date, they must also complete in-person resits of the *microteaching* and the Baccalaureate curriculum assessment.

The maximum grade for resit activities is 5/10.

Other Important Aspects

Language Accuracy

To pass this course, students must demonstrate good overall communicative competence, both oral and written, and a solid command of the Catalan language.

In all activities (individual and group), language accuracy, writing quality, and formal presentation will be considered. Students must be able to express themselves fluently and correctly and demonstrate a high level of understanding of academic texts. An activity may be returned (not graded) or failed if the instructor considers it does not meet these requirements.

Not Assessable

An activity will be considered *Not Assessable* if 2/3 of the assessment activities have not been submitted (proportional to the weight of the activity in the final grade).

Plagiarism

According to UAB regulations, plagiarism or copying of any assignment, or the use of AI without acknowledgment, will be penalized with a grade of 0, with no possibility of resubmission. This applies to both individual and group work (in the latter case, all group members will receive a 0).

Use of Artificial Intelligence (AI) Technologies

For this course, the use of AI technologies is allowed only for tasks explicitly authorized by the course instructor. Students must clearly identify which parts have been generated with AI, specify the tools used, and include a critical reflection on how they influenced both the process and the final outcome. Lack of transparency regarding AI use in an assessable activity will be considered academic dishonesty and will result in a total penalty (zero) for the activity.

Synthesis Exam

This course does not allow a synthesis exam in the case of a second enrollment.

Bibliography

BIBLIOGRAPHY Science Education

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DOMÈNECH, Jordi (2019). *Aprentatge basat en projectes, treballs pràctics i controvèrsies. 28 propostes i reflexions per ensenyar Ciències*. Premi Marta Mata de Pedagogia 2018. Rosa Sensat.

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MORALES, Mariana FERNANDEZ, Juan (2022) *La evaluación formativa*. Biblioteca de Innovación Educativa SM.

RUIZ-MARTÍN, Hector (2021) *Cómo aprendemos*. Barcelona: Graó

SANMARTÍ, Neus (2010) *Diez ideas sobre evaluación*. Barcelona: Graó

SANMARTÍ, Neus. (2002) *Didáctica de las ciencias en la educación secundaria obligatoria*. Síntesis Educacion.

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 Physics. 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' College London.

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

Disponible en català a: <http://phobos.xtec.cat/cdec/>

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PEDRINACI, Emilio. (2016): Qué debe saber todo ciudadano acerca del planeta en que habita. *Alambique. Didáctica de las Ciencias Experimentales*, núm. 83, 7-12.

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Biology didactics

ARCA, Maria (1990). Enseñar ciencia : cómo empezar : reflexiones para una educación científica de base .Barcelona. Paidós : Rosa Sensat, 1990.

ARCA, Maria (1987). Guardare per sistemi, guardare per variabili :un approccio alla fisica e alla biologia per la scuola dell obbligo. Torino : Emme Edizioni,

ARCA, Maria (2005). Organismi viventi : forme, trasformazioni e sviluppo : itinerari di lavoro per la classe prima, seconda e terza elementare. Torino : Emme Edizione.

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GIORDAN, Andrée; DE VECCHI, Gerard (1988). Los Orígenes del saber : de las concepciones personales a los conceptos científicos Sevilla : Diada Editoras, 1988.

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 anglesa fundada el 1943 pel fundador de la Morris Motors amb l'objectiu de millorar el benestar social. Financien recerca i innovació en educació i polítiques socials. Hi trobareu molt recursos d'activitats i 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

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(TEmRD) Teoria (màster RD)	1	Catalan	annual	morning-mixed