Universidad Rey Juan Carlos

TEACHING GUIDE

DIDACTICS OF NATURAL SCIENCES II

GRADO EN EDUCACIÓN PRIMARIA (INGLÉS)

ACADEMIC YEAR 2026-27

Publication date: 29-06-2026

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I.-Subject Identification	
Type	OBLIGATORIA
Teaching period	3 course, 2Q semester
Nº of credits	4.5
Language in wich the subject is taught	English

II.-Presentation

Didactics of Natural Sciences II is the second appointment for Degree in Primary Education students with the world of Natural Science, being understood in the word's traditional sense as comprising the scientific specialities of Physics, Chemistry, Biology, Geology, Biochemistry and Environmental Sciences.

In the Degree design, this subject comes after *Didactics of Natural Sciences I* and before *Experimental and Social Sciences in Primary Education*. Their contents won't be exclusively didactic, but a mixture of didactic experiences and strategies in sciences, together with teaching of the scientific matters themselves. Furthermore, references to Primary Education official curriculum, through the subject called *Ciencias Naturales* (Natural Science), and carrying out of inherent-to-experimental sciences practical activities must be continuous.

To be emphasized that, in the way the Degree formative itinerary has been scheduled, Chemistry, Evolution and Human being and his relationship with Environment will be this year deeply studied, whereas a major dealing in Physics and Biology was done in *Didactics of Natural Sciences I*, an also compulsory third year subject, remaining Geology as the core for the *naturalist* section of *Experimental and Social Sciences in Primary Education*, subject to be taught in the fourth year.

Subject aim

Didactics of Natural Sciences II aim is giving future schoolteachers some didactic and scientific basics they will need for the professional teaching practice within the framework of Primary Education, in the field we could name Environment knowledge (scientific specialities of Physics, Chemistry, Biology and Geology). Specially, Chemistry, Evolution and Human biologic group will be dealt in greater depth.

For this subject, it is expected the students will be given proper expertise in the field of Experimental sciences, either theoretical or practical, that will contribute to prepare them as Primary Education schoolteachers, finding out, at the same time, its importance for understanding not only physical events, but teaching job itself. Summarizing, ***Didactics of Natural Sciences II*** promotes developing a critical, thoughtful and active attitude for understanding Nature, natural phenomena and its didactics in Primary Education.

Master lines:

•The nature of science and scientific knowledge
•Theoretical foundations of teaching and learning of Sciences
•Deepening into Primary Education experimental sciences curriculum
•Study of physic-natural knowledge for scientific teaching in Primary education
•Scientific and practical activities according Primary Education level
•Design and planning of Teaching: intensifications in Chemistry and Environmental Sciences disciplines

III.-Learning outcomes

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CGI06. Information management capability
CGP01. Teamwork.
CGP05. Critical reasoning.
CGS05. Sensitivity to environmental issues
CG01. Acquire and understand the necessary knowledge of the different areas of study that make up the title in such a way that they train for the profession of Teacher in Primary Education.
CG05. Acquire the necessary learning skills to expand their studies autonomously.
CE02 . Knowledge of contents to be taught, understanding their epistemological singularity and the specificity of their didactics.
CE03 . Solid scientific and cultural and technological training
CE06 . Design and development of educational projects and programming units for adapting the curriculum to the sociocultural context .
CE01 . Know the different curricular areas of Primary Education (especially the subject that concerns us) with all the elements of the Teaching/Learning process and the interdisciplinary relationship between the areas.
CE02 . Effectively address learning situations (in design, development and evaluation) between the ages of 6 and 12, from a globalizing and integrating perspective of the different cognitive, emotional, motor, linguistic and self-regulatory dimensions. (Globalizing perspective)
CE03 . Create learning environments that encourage empathy , social behavior , autonomy and multicultural coexistence systematically observing the social , family and school environment. (Contextual and natural social perspective) .
CE07 . Design didactic actions related to understanding space and time in schoolchildren. (Space-time perspective)
CE11. Design experiences to know the natural world through sensory perception. (On sensory and experimental development)

- Key for degrees not adapted to RD 822/21: **CB** - basic competences, **CG** - generic competences, **CE** - specific competences, **CT** - transversal competences.
- Key for degrees adapted to RD 822/21: **CON** - knowledge, **COM** - competences, **HAB** - skills.

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IV.-Contents

IV.A.-Syllabus

IV. A. Subject themed sequencing

THEMATIC BLOCK I: CHEMICAL NATURE OF MATTER

Unit 1 Matter's atomic structure

- The chemical elements and its organization. Periodic System
- Atomic theories: from Leucippus and Democritus to Dalton
- Modern atomic models. Nucleus and shell. Protons, neutrons and electrons. Isotopes
- Elements periodic table

Unit 2 Chemical bond

- Ionic bond. Ionic compounds features
- Covalent bond. Molecules. Intermolecular forces
- Metallic bond. Physical properties of metals

Unit 3 Chemical reactions

- Symbolic representation
- Quantities in Chemistry: Stoichiometry
- Energy manifestations. Basic calculations
- Hugely important chemical reactions. Acid – Base reactions. pH scale. Oxidation and reduction
- Combustion, photosynthesis, corrosion, electric battery
- Polymerization process (natural and synthetic polymers)

Unit 4 Chemistry and Environment.

- Chemical sciences: contributions to building a sustainable society.
- Materials for 21st Century.
- Social and environmental implications of technological and social development.

THEMATIC BLOCK II: LIFE ON EARTH

Unit 5 Origin and spreading of Life on Earth. On the origin of the species: teaching and didactics

- Biosphere: origin and spread of life on Earth. Hypothesis and consequences. The geo-biological Eras.
- On the origin of the species. Fixism and Evolution theories. Development and growth of evolucionist theories
- Relationships between human being and other living things and Earth

Unit 6. Hominization process. Teaching and didactics.

- Stages in the evolutionary line
- Ancestors of *Homo sapiens*
- Evolutionary changes. Morphology and Culture

Unit 7. The human body. Teaching and didactics.

- Human body organization
- Cells, tissues, and organs of human body
- Main systems of human body.
- Food, nutrition and interaction

THEMATIC BLOCK III: SCIENCE, KNOWLEDGE AND CLASSROOM

Unit 8. The sciences learning

- Theoretical basics for Science Teaching-Learning
- Specific knowledge of strategies and resources for Science teaching: Natural Science at school. Scientific activities planning.

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Science laboratory organization
•Getting deep in Primary Education experimental sciences official curriculum
•Contribution to knowledge of strategies for reading comprehension and problems solving

IV.B.-Training activities

Type	Title
Lectures	Watching from different resources (web, DVD, etc.)
Other activities	Countryside trips. Visit to Chemistry and Evolution-related exhibitions in Madrid. Practical learning of landscapes, rocks and minerals in Madrid. Environment anthropization and learn by playing.
Lectures	Readings recommended by the teacher.
Academic tutorials	Numerical exercises under teacher proposal.

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V.-Student workload	
Theoretical sessions	20
Resolution of exercises, problems, case studies, etc.	20
Practical sessions in experimental, technological and clinical laboratories, fieldwork, etc.	1
Tests and/or exams	4
Academic tutorials	30
Related activities: conferences, seminars, etc.	6
Preparation of theoretical sessions and self-study	20
Preparation of practical tasks, exercises, case studies, projects, etc.	20
Preparation for tests and/or exams	14
Total student workload	135

VI.-Methodology and academic programme

Type	Period	Content
Other activities	Week 1 to Week 7	Field trips to natural sites, museums, exhibitions, planetarium, school-farms, water treatment plants, video-forums... Similar optional non-assessable activities will be done on line, through specific web sites
Practical sessions	Week 1 to Week 7	Practical exercises and activities and case studies will be set out and solved in the class either individually or bringing ideas together
Group work	Week 7 to Week 7	Groupworks presentation
Theoretical sessions	Week 1 to Week 7	Master classes in the classroom. Descriptive exposition of the subject, supporting on slides, Power point presentations and movies.
Academic tutorials	Week 1 to Week 1	Doubts and questions will be solved by individual or group interview, at request and into scheduled time, on line, via video-conference or Virtual Clasroom.

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Active methodologies or innovative teaching	Week 1 to Week 1	Gamification. Gamification can help motivate pupils. Elements from games like earning points, participate in competitions, and taking on challenges can be used in this subject as homework. This makes lessons more interactive than traditional ways of teaching.
Other activities	Week 1 to Week 1	Participation in Science contests

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VII.-Assessment methods

The general assessment method is continuous as established in the *Regulation for the Assessment of Learning Outcomes* of Rey Juan Carlos University.
All the assessment systems established in the degree report must be employed, except for those that have a minimum weight of 0%, which can be used by professors in the academic years they consider relevant. Each assessment system may be applied through one or more assessment activities, consistent with the system. No assessment activity can exceed individually 60% of the overall grade for the subject.
The sum of non re-evaluable activities cannot exceed 40% of the overall grade for the subject and, in general, should not have an established minimum grade (except for practical activities in which, strictly speaking, the conditions of the ordinary call cannot be reproduced in the extraordinary call).
Those students who do not manage to pass the subject in the ordinary call, or do not attend this first call, may attend the extraordinary call only for failed re-evaluable assessment activities.
The distribution and characteristics of the assessment activities are described below.

VII.A.-Description and weight of the assessment activities

Continuous ordinary assessment:
The distribution and characteristics of the assessment tests are those described below. Only in exceptional case and for special reasons may the teacher add changes to the Guide. These changes will require the prior consultation with the Subject Head and the prior and explicit authorisation of the Degree Programme Coordinator, who will notify the Vice-Rector's office in charge of Academic Affairs of the modifications made. In any case, the changes proposed must take into account the stipulations of the verified report. In order for these changes to take effect, they must be duly communicated at the start of the course to the students using Aula Virtual.
The combination of activities that are not re-assessable cannot exceed 50% of the subject grade and, in general, cannot have a minimum grade (except for the case of laboratory or clinical work placements, where duly justified), and tests which exceed 60% of the subject weighting cannot be added.
Extraordinary assessment: Students who do not manage to pass the ordinary assessment, or who did not attend, will be subject to completion of an extraordinary assessment to verify their acquisition of the skills established in the guide, only for activities that are re-assessable.
Advanced assessment: You can request to bring forward the assessment of one out of two calls (ordinary or extraordinary) to September, as long as you meet the requirements set out in Reglamento de Evaluación de los Resultados de Aprendizaje de la URJC. The assessment method to be used in the advanced call will be the same as for Regular and Extraordinary calls.
Assessment tests and its weighing description
Evaluation Systems
SE01. Two written tests with a minimum grade of 5 will be carried out. They will be reassessable at Extraordinary call. The sum of the weighting of both tests, relative to the final mark will be 80%. The first written test will take place at the end of the Chemistry content block and will weigh 40%. The second will take place at the Extraordinary call, with a weighting of 40%.
SE02. Experimental activities and individual work will be carried out without a minimum mark. They will not be re-assessable. The sum of the weighting of all the activities relative to the final mark will be 20%. The Chemistry laboratory practice will be weighted 10% of the final mark and the remaining percentage up to 20% of the final weighting will correspond to the research work.

VII.B. Assessment of students with academic exemption from class attendance

Having Academic Exemption from Class Attendance (DAAC) does not imply that students are automatically exempt from participating in the continuous assessment activities or in the training activities of compulsory attendance as established in the teaching guide. Once the exemption has been granted, students must contact the subject's teaching staff, who will propose the adaptations he/she may consider relevant, as long as they guarantee the acquisition and adequate assessment of the learning goals established. Students must maintain adequate communication with the teaching staff so that they may provide information on the dates for training and assessment activities, if these are not established in the programme and available for students at the time of achieving the exemption.
Subject with possibility of academic exemption: Yes.

VII.C. Review of assessment activities

In accordance with the Regulation for the Assessment of Learning Outcomes of Rey Juan Carlos University.

VII.D.-Students with a disability or special educational needs

In order to guarantee equal opportunities, non-discrimination, universal accessibility and academic success, students with disabilities or especial education needs may request curricular adaptations to follow their studies. These adaptations will be provided by the Unit of Attention to People with Disabilities of Rey Juan Carlos University, in accordance with the regulation which regulates the service for the Attention of People with Disabilities at the University. This Unit will issue a report for curricular adaptations, so that students with disabilities or special education needs must contact the service (at e-mail discapacidad.programa@urjc.es) in order to provide relevant information for different educational alternatives.

VII.E.-Academic behaviour, academic integrity and honesty

Rey Juan Carlos University is fully committed to the highest standards of academic integrity and honesty, so studying at the URJC means assuming and subscribing to the values of integrity and academic honesty set out in the University's Ethical Code. To support this process, the University has Rey Juan Carlos University's Academic Conduct Regulation as well as different tools (anti-plagiarism, supervision...) that offer a collective guarantee for the full development of these essential values.

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VIII.-Teaching resources and materials

Basic bibliography

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IX.-Professors

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Campus	Madrid - Vicálvaro
Category	Profesor/a Asociado/a
Person responsible for the subject	No
Tutorial timetable	Para consultar las tutorias póngase en contacto con el/la profesor/a a través de correo electrónico
Number of quinquennia	0
Number of sexennia	0
No. of positive evaluations by Docentia	0

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