

Learning outcomes integrated undergraduate and graduate programme biology and chemistry education

1. Interpret basic chemical concepts according to the new scientific knowledge and in relation to related sciences (mathematics, physics, biology), including the historical concept development.
2. Define terms using chemical terminology, nomenclature, units and other conventions.
3. Explain the equation of a chemical reaction considering its qualitative and quantitative meaning.
4. Explain the main types of chemical reactions.
5. Compare the structure of the substances and chemical reactivity.
6. Explain structural and energy changes, and kinetics during chemical reactions and physical processes.
7. Describe important biochemical processes, structure and activity of biologically important molecules.
8. Integrate knowledge from different chemistry topics applying it on selected examples.
9. Integrate chemistry knowledge with pedagogy, psychology, didactics and teaching methods by teaching chemistry.
10. Explain molecular mechanisms by which DNA controls the development, growth and morphological characteristics of an organism by applying the principles and laws of inheritance at the cell, individual and population levels.
11. Analyse the connection between the structures and the processes involved in the reproduction, growth, maintenance and regulation of cell and organism life enabling the survival of living beings.
12. Interpret how the developmental similarity of living beings reflects evolutionary and ecological connections emphasizing the causes of their variability during time and the consequences of adaptation to different living conditions, and developing awareness of the importance of preserving nature and life.
13. Compare different ecosystems through the interdisciplinary approach including the investigation of distribution and diversity of living beings in the biosphere, the reconstruction of cycles in nature emerging from natural events and predicting future changes.
14. Analyse the functions of human body and apply acquired knowledge towards responsible behaviour regarding personal and other people's health.
15. Distinguish the effectiveness of teaching strategies and related methods, techniques, activities and procedures for teaching subjects of biological and chemical scientific basis.
16. Apply scientific knowledge related to teaching and learning in order to create effective teaching of biology and chemistry.
17. Apply the basic rules of safe laboratory and field work including the risk assessment in performing the laboratory procedures and the independent application of standard analytic methods and interpretation of results.
18. Design teaching of biology and chemistry based on experiential learning whereby students achieve conceptual understanding of the teaching content, which enables the prevention and elimination of students' misconceptions (misconceptions / alternative conceptions).
19. Perform designed experiments during teaching chemistry and biology and guide students in reasoning to achieve conceptual change and explanations on examples from everyday life.

20. Carry out a lesson in primary and secondary school in accordance with curriculum, and European and national standards of teaching the subject, following the strategies of learning by discovery and student-centred teaching.
21. Didactically adapt biology and chemistry teaching to students, after analysing the psychological profile of the class and after the insight into the possible pedagogical solutions.
22. Critically use scientific and professional literature and other relevant information sources in teaching and applying scientific methodology in solving and communicating the results of biological problems in the student research.
23. Design an action research to improve teaching practice based on the application of the educational research results and presentation of educational experiences in the teaching process.
24. Create a motivating environment for active learning encouraging the development of abilities, knowledge and positive attitudes of all students with the application of information and communication technology.
25. Apply effective and appropriate methods of monitoring and evaluating the student work and progress and use the results of student evaluation for planning biology and chemistry teaching at the national and international level.
26. Implement well-designed popularization activities and programs to educate the wider community on current scientific topics and develop awareness of the importance of chemical and biological sciences for the development of society and their impact on human life and the environment.
27. Develop professional integrity and ethical behaviour in the teaching process accepting the need and importance of professional and methodological training through available lifelong learning programs.
28. Responsibly implement and execute the teaching tasks by setting clear and measurable learning objectives in teaching chemistry and biology according to the curriculum.
29. Critically evaluate performed teaching reflecting on possible improvements.
30. Participate in team work adapting to the work environment and appropriately communicating with students, parents and colleagues in the school environment.