

DEGREE: BS in CHEMISTRY

SPANISH OFFICIAL STATE GAZETTE (BOE): 10/08/2010

STARTING YEAR: 2009/2010

2. INFORMATION ABOUT THE DEGREE

2.2. Main disciplines which define the main areas of study of the degree

2301 Analytical Chemistry
2303 Inorganic Chemistry
2304 Macromolecular Chemistry
2306 Organic Chemistry
2307 Physical Chemistry
2403 Biochemistry
3302 Biochemical Technology
3303 Chemical Technology and Engineering
12 Mathematics
22 Physics

3. LEVEL OF THE DEGREE

3.1.2. Suitability of the degree to the corresponding educational level

In accordance with the Royal Decree 1393 from 2007, the Plan of Study proposed for the BS in Chemistry has a total of 240 credits, which contain all the theoretical and practical training undergraduates should achieve: basic aspects from their area of knowledge, optional or compulsory subjects, seminars, external training, supervised works, dissertations or other educational activities. Therefore and bearing in mind the type of subject, the following credit distribution is established in the Plan of Study:

Degree code	2501145
Institution code	21004522 Facultad de Ciencias Experimentales
Academic level	Bachelors of Science
Branch	Science
Council of Ministers date	30/10/2009
Publication in the Spanish Official Gazette	BOE 05/01/2010
Publication of the Plan of Study	BOE 10/08/2010
Basic training credits	60
Compulsory credits	144
Optional credits	21
Dissertation credits	15
Total credits	240

4. INFORMATION ON THE CONTENTS AND ON THE RESULTS OBTAINED

4.2.2. Learning results: knowledge, skills and competences gained after completing the degree and objectives associated to it

- Undergraduate have proved they understand and possess scientific knowledge from a scientific field whose basis starts in Secondary Education with a level supported by advanced textbooks and including knowledge from the avant-garde of their study field.
- Undergraduates know how to professionally use their knowledge in their job and have the competences usually shown through the elaboration and defense of ideas and problem solving within their area of study
- Undergraduates have the skills to collect and understand relevant data, usually within their area of study, in order to issue a judgement including a reflection about relevant social, scientific and ethical issues.
- Undergraduates are able to communicate information, ideas, problems and solutions both to a specialized and a non-specialized audience.
- Undergraduates have developed those learning skills required to undertake further studies with high levels of self-sufficiency.

5. INFORMATION ABOUT THE PURPOSE OF THE DEGREE

5.2. Objectives of the degree and professional qualification

- To instill interest in the learning of Chemistry to Chemistry undergraduates to enable them to appreciate its applications in several contexts and engage them in the intellectually stimulating experience of learning and studying.
- To provide undergraduates a steady and balanced basis of chemical knowledge and practical abilities.
- To develop in undergraduates the ability to use their chemical knowledge, theoretical and practical, to solve chemical problems.
- To develop in undergraduates, through the education in Chemistry, a range of practical and cognitive skills, and basic and cross curricular competences (listed below) which are valuable both in chemical and non-chemical aspects.
- To provide undergraduates a basis of knowledge and abilities with which continue in a self-sufficient way their studies in specialized areas of Chemistry or multidisciplinary areas.
- To create in undergraduates the ability to value the importance of Chemistry in the industrial, economic, environmental and social context.

5.2.1. Summary of the objectives and general competences listed in the Plan of Study

The basic and cross curricular competences for the BS in Chemistry listed below guarantee the basic competences for the degree established by the Royal Decree 1393/2007.

- Ability to analyze and synthesize.
- Ability to organize and plan.
- Oral and written communication in native language.
- Knowledge of a foreign language.
- Ability to manage data and generate information/knowledge.
- Problem solving.
- Ability to adapt to new environments and to make decisions.
- Teamwork.
- Critical thinking.
- Self-learning abilities for the continuous professional development
- Sensibility towards environmental issues
- Ethical commitment
- Entrepreneurial spirit and initiative

5.2.2. Specify if the degree allows competences for the practice of a profession, or a professional status, in accordance with the current national regulations, and if it grants access to a regulated profession.

The profile proposed for the University of Huelva Chemistry BS graduates implies the objective of providing qualified graduates for the professional practice of Chemistry in its different fields of work, joining the knowledge and the skills of this scientific field with the competences and abilities aimed for the professional development.

The competences provided by this degree for the practice of the chemist profession or for granting the chemist professional status, can be summarise as follows:

- To know the main aspects of the chemical terminology, nomenclature, agreements and units.
- To know the main types of chemical reactions and the main features associated to each of them.
- To know the principles and procedures used in the chemical analysis and in the characterization of chemical compounds.
- To know the main structural research techniques, including spectroscopy.
- To know the features of the different states of matter and the theories used to explain

them.

- To know the principles of Quantum Mechanics and its application in the structure description and in the properties of atoms and molecules.
- To know the principles of Thermodynamics and its applications in Chemistry.
- To know the kinetics of chemical change, including catalysis. Mechanistic interpretation of chemical reactions.
- To know the variation of the typical characteristics of the chemical elements and its compounds, including the groups relationship and the tendencies in the periodic table.
- To know the structural aspects of the chemical elements and its compound forms, including stereochemistry.
- To know the properties of the aliphatic, aromatic, heterocyclic and organometallic compounds.
- To know the nature and the behaviour of functional groups in organic molecules.
- To know the main synthetic routes in organic chemistry, including the functional group interconversion and the formation of carbon-carbon and carbon heteroatom chemical bonds.
- To know the relation between the macroscopic properties and the atom and individual molecules properties, including macromolecules (natural and synthetic), polymers, colloids and other materials.
- To know the structure and reactivity of the main types of biomolecules and the chemistry involved in the main biological processes.
- To know the instrumental techniques and their applications.
- To know the unitary operations in Chemical Engineering.
- To know the metrology of chemical processes including the quality management system.
- To be able to organize, manage and carry out production proceedings in a chemical laboratory and in complex industrial facilities where chemical processes are developed, as well as to design the work methodology.
- To know the properties and applications of materials.
- To use the required mathematical knowledge to understand and express with scientific rigour the relations between the variables and the physical chemistry functions, and the variation of these functions regarding their variables.
- To show basic knowledge of Applied Statistics which allow to estimate the data reliability.
- To develop numerical methods which allow problem solving.
- To know the hierarchical levels and molecular organization of the biomolecules of the living organisms.

- To know and distinguish between the different types of materials in order to choose the most suitable ones according to the required technological performance.
- To solve numerically differential equations.
- To develop algorithms which allow the resolution of evolution problems with computers.
- To describe the properties of the materials which increase the technological and industrial value and their physical chemistry basis.
- To know the structure, composition and properties of minerals.
- To know and describe the main structure models and their crystal chemical features.
- To know and use the fundamental and derived physical magnitudes, the unit systems in which they are measured and the equivalence between them.
- To know and use the principles of Mechanics and the relations between them, applying them to the movement of particles and to the systems of fluids and particles.
- To know and apply the concepts of field, electric and magnetic fields to phenomena related to forces and electrostatic potential, electromagnetic radiation and optical phenomena.

6. ADDITIONAL INFORMATION

6.1. Add the required additional information not listed in the previous sections

- Languages

Before completing the degree chemistry undergraduates should prove the knowledge of the English language with a B1 level, or an equal level in any other language of generalized used in the professions associated with this degree.

- Internships

The Faculty of Experimental Sciences promotes in undergraduates the contact with the professional market over the course of their degree. There is an internship programme to carry out work training in companies that undergraduates can request in their final years of the degree.

There is an optional subject during the second four-month period of the 4th year consisting of the internship of undergraduates in companies or institutions cooperating in works related to their degree and with the professional activities of chemists. The cooperation agreements required for the realization are processed in a centralized way through the Service of Guidance and Information, Training, Employment and Self-employment (SOIPEA), under the management of the University of Huelva's Vice-chancellor Office of Students. Before the enrolment period the different internship positions will be published. In any case, internships are regulated under the normative established by the University of Huelva and in accordance with the agreements signed with companies or institutions.

- Dissertation

Compulsory subject in the second four-month period of 4th year. Dissertations consist of the realization of a theoretical and/or experimental work under the direction and management of a professor from the degree, appointed for that purpose. Dissertations could also be carried out in the chemical industry, as well as in other institutions both public and private, prior to a cooperation agreement. Dissertations should contain a report which must include a brief introduction about the experimental background, the objectives and the working plan, the results with a critical review of them and the final conclusions.

The dissertation will be defended against a collegiate Committee in accordance with the current regulations of the Faculty Board of the college. The Committee will evaluate the oral exposition of the work presented and the paper dissertation handed, taking into account as well the director's report on the undergraduate. To be able to defend the dissertation undergraduates should pass all the subjects of the first three years of the degree. Dissertations can also be defended in the first four-month period, bearing in mind that undergraduates cannot be enrolled in more than 30 credits per four-month periods.

- Mobility

BS in Chemistry offers undergraduates exchange European programmes (ERASMUS and SOCRATES) making easier the mobility of our students in the European Union.

We also offer a national mobility programme within Spanish Universities where Chemistry BS is lectured. In order to fund these stays, there is a scholarship programme. Among the goals of the mobility programmes undergraduates taking part in them are expected to enjoy a social and cultural experience, improving their CVs towards their inclusion within the labour market, etc. Besides, undergraduates' involvement in these programmes strengthens their communication skills, cooperation, adaptation and understanding of other cultures.