

History of Chemistry

Code: 102494
ECTS Credits: 6

Degree	Type	Year	Semester
2502444 Chemistry	OT	4	2

Contact

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Use of languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Prerequisites

Chemistry undergraduates (4th year)

Objectives and Contextualisation

This subject provides a historical, humanistic reflection on the origins and continuous evolution of one of the fundamental branches of modern science. Far from the old stories that separated chemistry into two very well-diversified stages (the pre-scientific period of alchemists and craftsmen, and the scientific, modern period of scientific progress), here chemistry appear in a constant search for its identity, in permanent evolution (from alchemy and natural philosophy to biochemistry). Historical examples bring us closer to the problem of the identity of chemistry as a scientific, professional discipline, and cover topics such as the emergence of diverse specialties, the public image of chemistry, chemistry from a gender perspective, the environmental price of modern chemistry, etc.

The subject attempts to bring the student closer to basic history of chemistry contents, in the general context of the history of science. It aims to contribute to the acquisition of a series of skills related to intellectual work: reading historical texts, biographical analysis, reconstruction of experiments, and oral and written expression. Historical texts in English are of common use in the classroom.

Skills

- Be ethically committed.
- Communicate clearly in English.
- Communicate orally and in writing in ones own language.
- Learn autonomously.
- Manage, analyse and synthesise information.
- Obtain information, including by digital means.
- Reason in a critical manner
- Recognise and analyse chemical problems and propose suitable answers or studies to resolve them.
- Use IT to treat and present information.
- Use the English language properly in the field of chemistry.

Learning outcomes

1. Be ethically committed.
2. Communicate clearly in English.
3. Communicate orally and in writing in ones own language.
4. Design effective information search strategies in any research subject.
5. Fluently expose, orally and in writing, the basic concepts of the history of chemistry.
6. Learn autonomously.
7. Manage, analyse and synthesise information.
8. Obtain information, including by digital means.
9. Read and understand chemistry textbooks in the English language.
10. Reason in a critical manner
11. Use IT to treat and present information.

Content

01 Introduction: Chemistry and history

02 The alchemical heritage

Natural philosophy

Metallurgy

Medicine

03 Chemistry and the Scientific Revolution

The Scientific Revolution of the XVI and XVII centuries

Paracelsus

Libavius, Lemery, Boyle

04 Chemistry and the Newtonian dream

Newton's legacy

Affinity tables

The identity of chemistry in the eighteenth century

05 The chemical revolution I

The time of phlogiston

Pneumatic chemistry

The language of chemistry

06 The chemical revolution II

Combustion and the synthesis of water

Marie-Anne Paulze: chemistry and gender

Lavoisier and the *Traité*

07 Atoms, molecules and elements

Dalton's Atomism

Electrochemistry and dualism

The periodic table

08 Organic chemistry

Liebig's laboratory

Kekulé's dream

Pasteur's optical isomerism

09 Physical chemistry

The emergence of a new discipline

The Ionists: Ostwald, Arrhenius and Van 't Hoff

William Ramsey and the noble gases

10 The physical atom

The new physics in 1900

The chemical bond (Lewis)

The chemical bond (Pauling)

11 Chemistry and industry

From Leblanc to Solvay

The German dyestuff industry

Chemical engineering

12 Environmental chemistry

Air and water pollution

Rachel Carson and ecofeminism

The problem of plastics

13 The public image of chemistry

Popular chemistry: Jane Marcet

Corporate images

Exhibitions, museums and propaganda

Methodology

Every week is devoted to a topic. Generally, the session on Wednesdays, from 9 to 10, will be more theoretical, with a lecture, and the Friday session, from 9 to 11, will be more practical, with historical materials and discussion in class. For each topic there are some texts and / or reference images. All materials will be available before each session on the Virtual Campus (CV). A general question is included in the CV for each weekly topic that will guide your readings and the writing of your essays. At the CV, you will also find presentations for each session, and additional links or texts that we will use in class.

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Lectures	34	1.36	4, 5, 7, 9, 1, 10
Type: Supervised			
Discussions on images and texts	14	0.56	2, 3, 5, 7, 9, 1, 10
Type: Autonomous			
Autonomous	96	3.84	6, 4, 7, 9, 1, 8, 11

Evaluation

Continuous assessment

50%: Two partial exams that will each count 20% and 30% of the final grade respectively. There will be some questions of synthesis and comments on some texts and images. Both exams are without notes, dossiers, or any kind of computer, digital material.

The material posted on the virtual campus and discussed in class is also stuff for the exam.

40%: Written essays of a maximum of 1000 words (a minimum of 6 must be submitted). Weekly essays must respond to the questions appearing at the CV. they must be delivered via virtual campus. Ability to synthesize, clarity of arguments and the proper use of certain historical examples (texts and images) will be assessed.

10%: Review of a chemistry book, written at a historical context, for chemistry students or for readers not necessarily familiar with science in general. It must have an approximate length of 1,200 words. The review must place the book in its historical context, clearly, critically and originally expose its main ideas, and try to relate them to issues and debates that have come out in class. The review is delivered the same day of the second partial exam and is not recoverable.

To pass through continuous assessment the student must obtain an average of no less than 5 (partial exams + essays + review)

Second-chance assessment

To go through a second-chance assessment. the students must be previously assessed on essays, partial exams, review), which correspond to a minimum of 2/3 of the total grade. The minimum average rating of the activities evaluated can not be less than 3.5.

The second-chance assessment will consist of a global examination and the delivery of 3 improved essays. Grade is calculated from the mark of the global exam (60%) and of the new tests (40%)

Any change in the assessment process will be published in due course at the virtual campus.

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Essays	40%	0	0	6, 2, 3, 5, 9, 1, 10
Exam 1st part	25%	3	0.12	3, 5, 1, 10
Exam 2nd part	25%	0	0	6, 3, 4, 5, 7, 9, 8, 10, 11
Review	10%	3	0.12	3, 5, 1, 10

Bibliography

Bibliografia

Bibliografia general

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(*)BENSAUDE-VINCENT, Bernadette; STENGERS, Isabelle, *Historia de la química*. Addison-Wesley. Madrid 1997. (*Histoire de la Chimie*. La Découverte. Paris 1993).

(*)BROCK, William H., *Historia de la química*. Madrid. Alianza Editorial 1998 (*The Fontana History of Chemistry*. Fontana Press. London 1992).

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(*)IHDE, Aaron J., *The Development of Modern Chemistry*. Harper Row. New York 1966.

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Bibliografia complementària

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PELLÓN GONZÁLEZ, Inés (ed.) *El atomismo en química. Un Nuevo Sistema de Filosofía Química de John Dalton. Acompañado de un ensayo de Alan J. Rocke*. Publicacions de la Universitat d'Alacant, Alacant 2012.

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Pàgines web d'interès

[The Alchemy Virtual Library](#)

Una pàgina excel·lent dedicada a l'alquímia amb textos clàssics (alguns en castellà), imatges, estudis i enllaços.

[Azogue](#) (Pàgina dedicada a l'estudi històric de l'alquímia. En castellà)

[AMBIX: The Journal of Society for the History of Alchemy and Chemistry](#)

(La principal revista especialitzada en història de la química publicada per la [Society for the History of Alchemy and Chemistry](#))

[Chemical Heritage Foundation](#)

Dedicated to preserving and promoting the history of chemistry, The Chemical Heritage Foundation's world-class collections include instruments and apparatus. Philadelphia.

[Carmen Giunta's History of Chemistry Page](#). Selecció de textos clàssics d'història de la química.

[Premis Nobel de Química](#). Biografies, textos i materials diversos sobre tots els premis Nobel de química de la història

[Espais d'Experimentació: el Laboratori de Química a través de la Història](#). Exposició a la Biblioteca de Ciències de la UAB en la celebració de l'any de la química (2011)