VNIVERSITAT DE VALÈNCIA

Course Guide
33187 History and social aspects of molecular biosciencies

COURSE DATA

Data Subject	
Code	33187
Name	History and social aspects of molecular biosciencies
Cycle	Grade
ECTS Credits	6.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. year	Period
1102 - Degree in Biotechnology	Faculty of Biological Sciences	1	Second term

Subject-matter

Degree	Subject-matter	Character
1102 - Degree in Biotechnology	89 - History and social aspects of molecular biosciences	Basic Training

Coordination

Name	Department
FERRAGUD DOMINGO, CARMEL	225 - History of Science and Documentation
GUILLEM LLOBAT, XIMO	225 - History of Science and Documentation

SUMMARY

The course "Historic and social aspects of molecular biosciences" is intended to provide students with information and a critical attitude towards scientific knowledge in its relationship with society and culture. It discusses the origins and evolution of biological sciences and more specifically of molecular biosciences. It provides the conceptual tools to analyze and understand the meaning of biomolecular technoscience in contemporary society and stimulates a critical analysis of current trends in life sciences, their social implications, their link to social policies and to moral conflicts. With this perspective, students will analyze an update of: knowledge production systems; scientific practices; factors for the development of biological knowledge; the main elements of the practical and conceptual revolution caused by the molecular sciences in the twentieth century; and the new social role of scientists in the 21st century.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

OUTCOMES

LEARNING OUTCOMES

Assimilation and critical analysis of scientific information

Identification of the relationships between science and society

Analysis of the cultural values implicit in the knowledge and practices of science

Assimilation of the historical dimension of scientific knowledge

Assimilation of the process by which scientific knowledge, and its relation with society, is constructed.

Assimilation of the origins and the construction of the experimental method

Ability to interpret the ethical and social implications of biological experimentation.

Ability to work in group

Public communication and reasoning of personal opinions.

Ability to obtain scientific information in the biological disciplines, and more specifically in molecular biology, and to assess their validity

Awareness of the relationship between the dynamics of science and the needs and interests of society

Ability to make a point on the ethical dilemmas raised by science and technology

Ability to design research projects including the evaluation of economic, social, ethical, and communicative elements involved in the techno-scientific development.

DESCRIPTION OF CONTENTS

1. Theoretical lessons

1. Science in Ancient History (from Ancient Greece to medieval Europe).

2. The main stages of evolution of early modern science.
Elements for the transition to modernity. The "scientific revolution" in biology (gender, power, sites). Universities and scientific academies.

3. The development of experimental biology.
Origins of contemporary biomedical science (19th century). Morphological sciences and the cell theory. Embryology, bacteriology and physiological sciences. The new experimental biology and its controversies (animal experimentation, scientific instruments, etc.). The birth of the evolutionary paradigm. Social Darwinism.

4. The molecularization of biology.
Origins of Mendelian genetics and biochemistry. Eugenics. The emergence of molecular biology (20th century). From the protein to DNA. The structure of DNA and the central dogma of molecular biology.

5. The birth of genetic engineering and the new biotechnologies (main lines of development). Protein and DNA sequencing. The Human Genome Project. The regulation of genetic engineering. Intellectual property in the biosciences. The ethical, economic and social dimensions of the new biotechnologies.

2. Practical activities

1. Thematic practical sessions.
Students will analyze science communication in academic and in popular science journals.

2. Reading and review of a book included among the bibliography proposed by the professor.

3. Trips.
There will be two guided tours in exhibitions or museums dealing with topics related to the course and student will carry out specific activities in order to analyze the role of museography and museology in the popularization of scientific knowledge

4. Seminars.
Addressing the social and ethical implications of molecular biosciences through the discussion of a range of themes proposed by the professor.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	33,00	100
Classroom practices	25,00	100
Computer classroom practice	2,00	100
Development of group work	5,00	0
Development of individual work	25,00	0
Study and independent work	25,00	0
Readings supplementary material	10,00	0
Preparing lectures	25,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

The work and learning process will integrate various complementary activities:

1. Lectures in the classroom: will consist of two sessions per week in which the teacher will present and discuss the main issues of the program (see the section on theory contents).

2. Seminars and practical work in the classroom: will consist of a weekly session in which students work with a variety of sources: scientific texts, databases, popular science texts, films or newspaper articles.

3. Reading and critical commentary on a book selected from the literature given by the teacher.

4. Trips. There will be two guided tours in exhibitions or museums dealing with topics related to the course and student will carry out specific activities in order to analyze the role of museography and museology in the popularization of scientific knowledge.

5. Oral communications by groups. The groups of students will present a work analyzing the social and ethical implications of molecular biosciences and this presentations will serve as a starting point for the discussion in the classroom.

6. Tutorials. Tutoring sessions will be optional. Students have three hours per week of free consultation with the teacher in relation to academic work being carried out.

EVALUATION

Theoretical examination of the contents of the course syllabus: up to 6 points (to pass the course students must obtain at least 40%). The exam will include questions dealing with the historical contextualization and the critical analysis of the main issues addressed in the course.

Practical work in the classroom: up to 2 points (in order to be evaluated, all of them must be submitted).

Reading and critical analysis of a book: up to 1 point

Work on the exhibitions and museums: up to 1 point.

(For the evaluation of the practical sessions the professor will take into account the attendance, participation and attitude in the classroom as well as the communication abilities and the mastery of contents).

REFERENCES

Basic

- Barona Vilar, J.L. Història del pensament biològic. Valencia, PUV, 2002.

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Chalmers, A.F. Qué es esa cosa llamada ciencia? Madrid, Siglo XXI, 1993

Collins, H., Pinch, T. El gólem: lo que todos deberíamos saber acerca de la ciencia. Barcelona, Crítica, 1996.

Fara, P. Breve Historia de la Ciencia. Barcelona, Ariel, 2009.

Guerrini, A. Experimenting with humans and animals: from Galen to animal rights. Baltimore, Johns Hopkins University Press, 2003

Kay, L.E. The molecular vision of life: Caltech, the Rockefeller Foundation, and the rise of the new biology. New Cork, Oxford University Press, 1993.

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Morange, M. Histoire de la biologie moléculaire. Paris, La Découverte, 1994.

Pestre, Dominique. Ciència, Diners i Política. Assaig dinterpretació. Santa Coloma de Queralt, Edèndum, URV, 2008.

Shapin, S. La revolución científica: una interpretación alternativa. Barcelona, Paidos, 2000.

Shapin, S. The Scientific Life. A moral history of a late modern vocation. Chicago and London, Chicago University Press, 2008.