



Universidad
Católica de
Valencia
San Vicente Mártir



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COURSE SYLLABI

Biology

Prof. Carmen Fagoaga Garcia

Philosophy Degree
1st Year

2020-2021



BIOLOGY

Preliminary remarks:

The teaching on this course is online. As specified in the Methodology section of this guide, it is interactive e-learning that is undertaken using audiovisual resources.

1.- COURSE DETAILS

Course Name	Biology
ECTS Credits	6
Type of Learning	Required
Calendar	2 nd Semester of first course
Module Name	Scientific basis
Course Requirements	None
Lecturer	Carmen Fagoaga Garcia (carmen.fagoaga@ucv.es)

2.- BRIEF DESCRIPTION OF COURSE CONTENTS



The main purpose of this course is to understand generally the major biological processes in order to develop critical opinion about the contemporary scientific advances in the area of biology.

We begin therefore with a brief introduction where we see that biology is a science in permanent construction, which, since its origins, many questions were answered, others were replaced and a few are still open. Once assumed the dynamic aspect of biology, we will study the unit of life, that is, the cell. On its composition, types, organization, reproduction, ... etc. Later, we will discuss the birth of Genetics and learn the basics of inheritance, what exactly is the DNA and what the recombinant DNA technology and its many current applications. Finally, we will study how the theory of evolution was originated, as it affects our current perception of the world and how the man has evolved into *Homo sapiens*.

3.- COURSE PROGRAM AND CALENDAR (2012-2013)

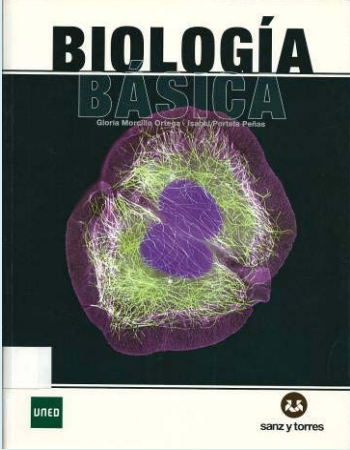
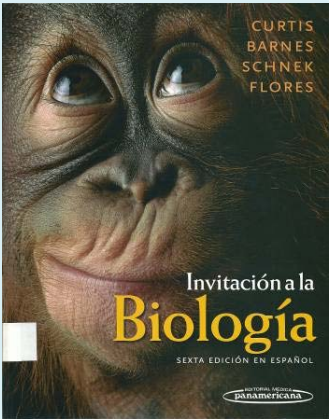
<p>1. The science of life</p> <ul style="list-style-type: none">1.1. What is life?1.2. The origin of life1.3. Major transitions in the history of life1.4. Characteristics of living beings1.5. Unity and diversity of the living world1.6. Species model on biotechnological research	September 2020
<p>2. Large molecules and cell</p> <ul style="list-style-type: none">2.1 Large molecules and Monomers2.2 Properties of the water2.3 Cellular organization2.4 Types of cells2.5 Cell culture2.6 Stem cells	October 2020
<p>3. From DNA to proteins</p> <ul style="list-style-type: none">3.1 Structure of the genetic material3.2 Chromosomes3.3 Types of RNA3.4 Replication, Transcription and Translation3.5 Genetic code	October 2020



3.6 Cell reproduction	
4. Genetics and genomes	October 2020
4.1 Basic concepts	
4.2 Genetic heritage	
4.3 The laws of Mendel	
4.4 Genomes	
4.5 The human genome project (HGP)	
4.6 Genomics and other omics disciplines	
5. Recombinant DNA technology	November 2020
5.1 Early experiments	
5.2 Gene cloning. General schema	
5.3 Basic elements	
5.4 Methods of gene cloning	
5.5 Gene cloning in bacteria	
5.5.1. Types of vectors	
5.5.2. Methods of transformation	
5.6 Applications	
6. Genetically modified organisms (GMO)	November 2020
6.1 Gene cloning in animals	
6.1.1. Methods of transfection	
6.1.2. Selection and marker genes	
6.1.3. Most common vectors	
6.1.4. Transgenic animals and knockout	
6.2 Gene transfer to plants (Transgenic plants)	
6.2.1 Plant tissue culture	December 2020
6.2.2 Vectors, selection and marker genes	
6.2.3 Methods of gene transfer	
6.2.4 Agri-biotech crops	
7. Evolution	December 2020
7.1 Darwinian revolution and the synthetic theory	
7.2 The evidence for biological evolution	
7.3 Evolutionary change: mechanisms and consequences	
7.4 Hominid evolution	
7.5 Current expansion of evolutionary theory	

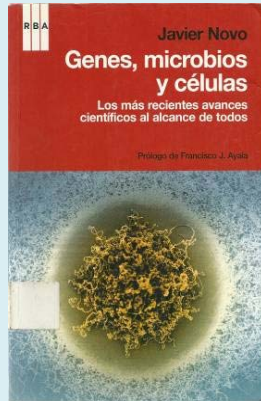
4.- REFERENCES

4.1 Basic bibliography

4.1.1	Powerpoint presentations, and course lessons (Biology) by Carmen Fagoaga. Also some accompanying videos available in the subject moodle platform and virtual class.
4.1.2	 <p>Gloria Morcillo Ortega, Isabel Portela Peñas (2010). Biología básica. Editorial Sanz y Torres, Madrid ISBN: 978-84-92948-31-4</p>
4.1.3	 <p>Curtis, Barnes, Schnek, Flores (2006). Invitación a la Biología. Editorial Panamericana, Buenos Aires ISBN : 950-06-0447-7</p>

4.2 Further reading

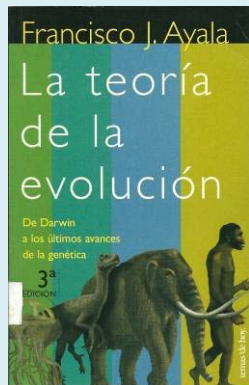
4.2.1



Javier Novo (2011).

Genes, microbios y células. Editorial RBA Libros, S.A., Barcelona
ISBN: 978-84-9867-902-1

4.2.2

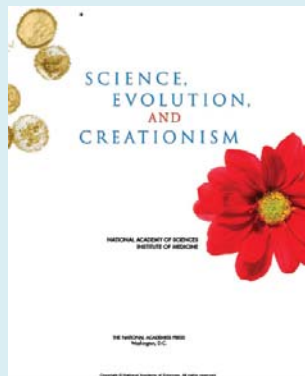


Francisco J. Ayala (2001)

La Teoría de la Evolución. De Darwin a los últimos avances de la Genética.
(3^{er}a edición) Ediciones Temas de Hoy, Madrid
ISBN:84-7880-975-9

4.2.3

4.2.4

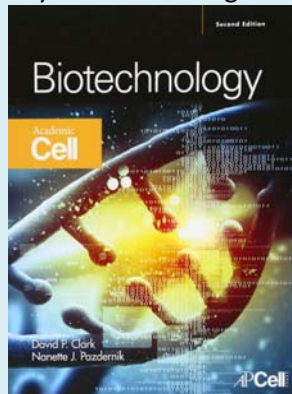


National Academies of Science (2008)

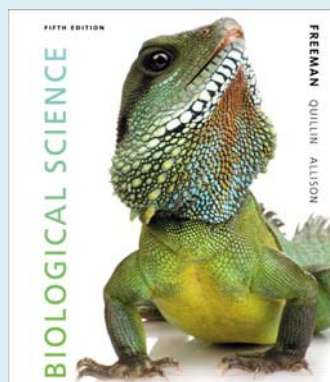
Science, Evolution and Creationism. The National academies Press, Washington D.C. (U.S.A.)

Hay una versión digitalizada en: <http://www.nap.edu/catalog/11876.html>

4.2.5



Clark, D.P. and Pazdernik N. (2016) *Biotechnology* (2nd Edition). Oxford: Elsevier
ISBN: 978-0-12-385015-7



Freeman, S. Quillin, K. and Allison, L. (2014). *Biological Science* (5th Edition). USA: Pearson Education
ISBN-9780321743671

5. METHODOLOGY



This subject corresponds to 6 ECTS credits, which is equivalent to 150 hours of student's work. That total amount of hours is distributed into 60 hours of teaching (2.4 ECTS) and 90 hours of student's self-study (3.6 ECTS).



In this subject, the teaching process (2.4 ECTS) is based on the following teaching-learning methodology:

- 1) A **dinamic text**, designed by the professor.
- 2) **Videoconference**, through which theory lessons are given as well as guided tasks (training tasks, text analysis, seminars, etc.) and collective tutorials. Videoconferencing must be always interactive and these sessions last 90 minutes.
- 3) Attending **Webinars** organised by the faculty and the head of the Department.
- 4) **Video-lessons** about the most relevant topics for the subject.
- 5) **Telematic activities through** UCVnet platform (such as taking part in debate forums, solving practical questionnaires etc.), with the lecturer's intervention to correct and provide some guidance to students.
- 6) **Assessment tests**.

Student's self-study (3.6 ECTS) is distributed in different activities:

- Asincronic re-view of the videoconferences.
- Preparing theory and practical lessons (*flipped classroom*).
- Course assignments.
- Studying and preparing the final assessment test.



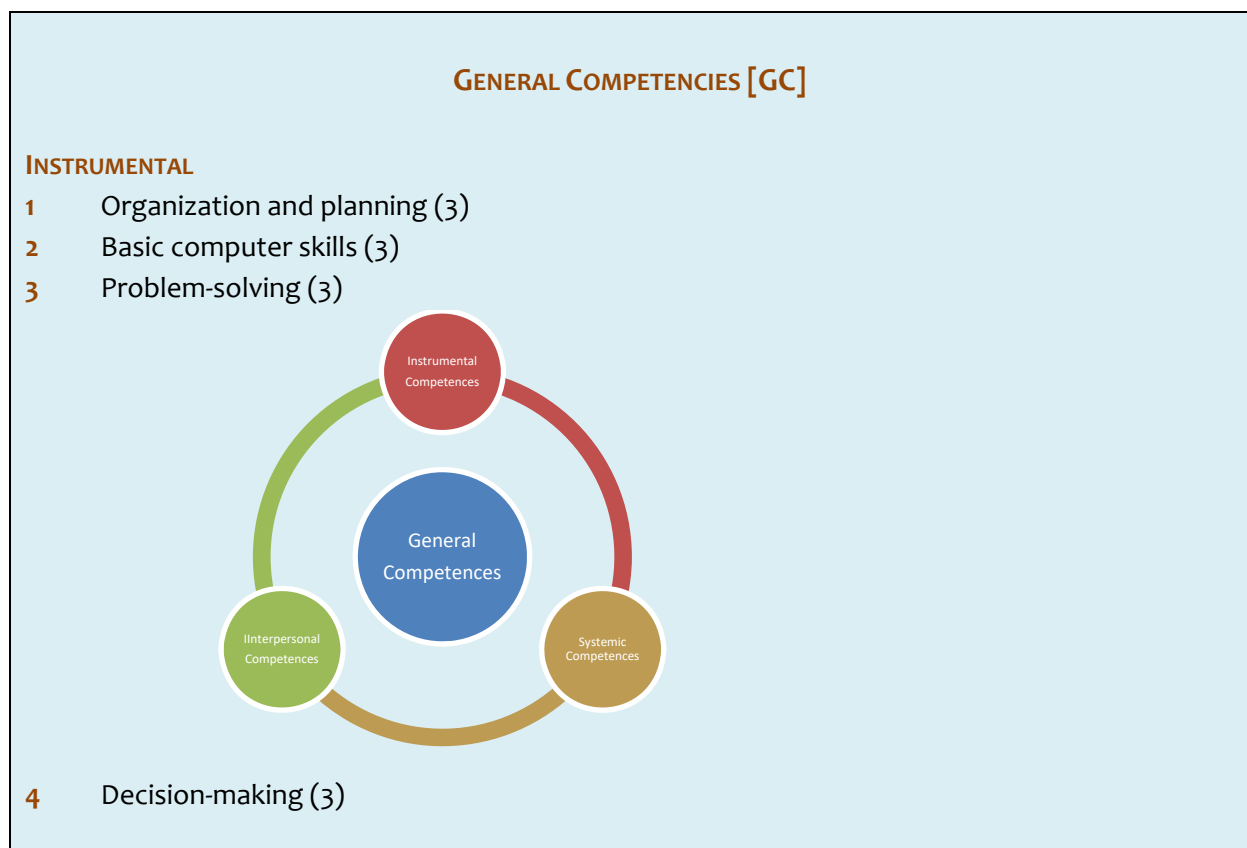
The General Competence 9 –ethical commitment- will be evaluated through case study, problems, moral dilemmas, etc., discussed in the lessons.

The final mark of the subject will be based on the following items:

- 1) Attendance and participation
- 2) Continuous assessment
- 3) Final test

6.- COMPETENCIES TO BE ACQUIRED BY THE STUDENT

(The figures refer to the officially approved (by ANECA) list of competencies of this Online Degree in Philosophy)





INTERPERSONAL

- 5 Interpersonal skills (3)
- 6 Intra- and interdisciplinary team work (2)
- 7 Ability to communicate with non-experts (3)
- 8 Ability to work in multicultural and international environments (3)
- 9 Ethical commitment (3)

SYSTEMIC

- 10 Ability to apply knowledge to practical situations (3)
- 11 Ability to learn and teach (3)
- 12 Ability to adapt to new situations and generate new ideas (3)

SPECIFIC COMPETENCES [SC]

- 17 To be able to pose philosophical questions (2)
- 18 To be able to relate different philosophical topics (3)
- 21 To become acquainted with the central paradigms of scientific thinking (3)
- 23 To write philosophical essays and show evidence of analytical and synthetic skills (3)
- 25 To be able to understand and evaluate philosophical arguments (3)
- 26 To be able to construct philosophical arguments (2)

- 27 To be able to attain a high level of reading comprehension of original foreign language philosophical texts (3)
- 34 To comprehend and assess scientific methodologies in their different scopes (3)

7.- LEARNING OUTCOMES

RA₁. That students can organize and plan their activities in relation to the subject [**GC1**]

RA₂. That students acquire the basic computer knowledge and skills required for the online teaching method of the subject [**GC 2**]

RA₃. That students develop the necessary interpersonal skills to complete the intra and interdisciplinary tasks required to be able to communicate with non-experts in the material [**GC 1, 5, 6 y 7 CE 18, 21 y 23**]



RA₄. That students use their ethical commitment to put their theoretical knowledge into practice and adapt to new situations generating new ideas [GC 9, 10,11 y 12]

Additional considerations

RA₅ That students possess an overview of the cell and its relationship with the environment [CG 3, 10, y 11 CE 17 y 34]

RA₆ That students learn the bases of cellular biochemistry [CG 3, 10, y 11 CE 17 y 34]

RA₇ That students understand the basics of genetic inheritance and its technological and ethical implications [CG 3, 10, y 11 CE 17 y 34]

RA₈ That students find out and know reasoning theory of evolution [CG 3, 10, y 11 CE 17 y 34]

RA₉ That students develop a critical spirit against scientific advances in the area of biology [CG 2, 4, 16 y 7 CE 27 y 34]

8.- ASSESSMENT

Students should self-assess following the development of each topic. There will be an assessment of the content of the theory and practical lectures, following the procedure set out for the Degree:

Assessment Tool	Type of Learning	Allocated Percentage
Attendance and participation in synchronic sessions	Online	10%
Submission of requested assignments	Online	10%
Final evaluation through practical and written assignments	Face-to- Face or Online	80%