ESCI upf.
School of International Studies

TEACHING PLAN FOR

Introduction to Biology

1. Basic description

Name of the course: Introduction to Biology
Module: **Life Science**

Academic year: 2016-2017
Year: 2016
Term: First
Degree / Course: First
Code: 51102
Number of credits: 6
Total number of hours committed: 51
Teaching language: English
Lecturer: Mireia Olivella, Lucas Carey
Timetable: Complete

2. Presentation of the course

This course covers fundamental concepts and subjects in biology, from the basic molecules of life to molecular cell biology and genetics. Subjects include the structure and function of DNA, RNA, proteins and cellular components. It provides notions of basic mechanisms such as photosynthesis, glycolysis, cell cycle, inheritance and reproduction, as well as concepts and ideas related to the origin of life and evolution.

The course contains is structured in four parts:

1. Macromolecules in living organism
2. Cell Biology
3. Introduction to Genetics
4. Metabolism

The course will combine theoretical sessions with seminars and computer practice.

3. Competences to be worked in the course
Complete (crossing the curriculum and the list of competences)

General competences	Specific competences
CB1, CB2, CB4, CG1	CE1, CE2, CE4, CE7

I. General competences

- CB1. That the students have demonstrated to have acquired the knowledge and understanding in a field of study that starts from the basis of general secondary education, and is typically at a level that although it is supported by advanced textbooks, includes some aspects that involve knowledge of the forefront of their field of study.

- CB2. That the students know how to apply their knowledge to their work or vocation in a professional manner and have competencies typically demonstrated through devising and defending arguments and solving problems within their field of study.

- CB4. That the students can convey information, ideas, problems and solutions to both specialist and non-specialist audiences.

- CG1. That the students will acquire an intra- and interdisciplinary training in both computational and scientific subjects with a solid basic training in biology.

- *Specific competences*

- CE1. To acquire biological knowledge from the cellular to the organismal level, with an interdisciplinary vision and special emphasis on biomedical applications.

Learning outcomes

RA1.1. Validate appropriate knowledge and skills in the area of biological sciences.

RA1.2. Identify different types of molecules, understand their chemistry and the relationship between its three-dimensional structure and biological function.

RA1.3 Understand the stages of gene expression: phenomena of cell division and death in unicellular and multicellular organisms, regulation and use of RNA as a functional molecule.

RA1.4. Identify the main metabolic pathways and the process of transmission of extracellular signals.

5. Contents

THEORY

0. Introduction to Biology (1h)
1. Macromolecules in living organisms. DNA and RNA (from structure to function, transcription, translation). Proteins (Primary Structure, Secondary Structure, Tertiary Strucure, Quaternary Structure, Folding, Post-translation modifications). Enzymes (Co-enzymes, co-factors). Lipids. Carbohydrates. (9h)
2. Cell Biology. Eukaryotic Cell. Prokaryotic Cell. Cell Cycle. Cellular Components. Reproduction. Model organisms. (7h)
3. Introduction to Genetics. Origin of life. Evolution. Heridity. Variation. Speciation. Tree of life (7h)
4. Metabolism. Cellular Respiration. Glycolysis. Krebs Cycle. Oxidative phosphorylation. Photosynthesis. Calvin Cycle.(6h)

SEMINARS

Seminar 1 (2h): Genome Browser.
Seminar 2 (2h): Protein Databases (Uniprot, Pfam)
Seminar 3 (2h): Macromolecules structure visualization
Seminar 4 (2h): Macromolecules structure visualization
Seminar 5 (2h): Genetic Exercises.
Seminar 6 (2h): Metabolism Exercises.

PRACTICE

Practice 1 (3h): Eukaryotic Cell vs Prokaryotic Cell
Practice 2 (3h) : Microbiology.
Practice 3 (3h):

6. Assessment

In order to successfully complete this course, the student's final grade must be al least 50 %.

The theoretical concepts of the course subject will be evaluated with three exams consisting on short questions and problems (Theory Exam 1, Theory Exam 2 and Theory Exam 3). In order to compute the final grade of the course, the Theory Exams must be passed with 50%. Theory Exams can be reassessed in July.

The seminars are mandatory and its evaluation can not be reassessed. The evaluation will consist on short exercices or questions that the student has to answer at the end of each seminar (from seminar 1 to seminar 4).
The practices are mandatory and its evaluation can not be reassessed.

The grades obtained at the recuperation exam will substitute the grades during the trimester and will use to calculate the final grade according to the percentages reported above.

Copy in any exam or plagiarism in essay implies failing the course.

Assessment elements	Time period	Type of assessment		Assessment agent			Type of activity	Grouping		Weight (%)
		Comp	Opt	Lecturer	Self-assess	Co-assess		Indiv	Group (#)	
Theory Exam 1	Week 5	X		X			Exam	X		20%
Theory Exam 2	Week 11	X		X				X		30%
Theory Exam 3	Week 11	X		X				X		10%
Seminars 1-6 Evaluation	Weekly	X		X			Exercise (seminar)	X		20%
Practice		X		X				X		20%

Working competences and assessment of learning outcomes:

	CB1	CB2	CB4	CG1	CE1
Theory Exam Part 1	X	X	X	x	X
Seminars 1-4 Evaluation	X	X	X	X	X
Theory Exam Part 2	X	X	X	X	X
Practical evaluation	x	X	x	X	x

6. Bibliography and teaching resources

- Basic bibliography

John L. Tymoczko, Jeremy M. Berg , Lubert Stryer. Biochemistry: A Short Course. MacMillan. 2016.

Despo Papachristodoulou, Alison Snape, William H. Elliott, and Daphne C. Elliott. Biochemistry and Molecular Biology, Fifth Edition January 2014. Oxford University Press.

Jeremy M Berg; John L. Tymoczko; Gregory J. Gatto, Jr.; Lubert Stryer. Biochemistry. MacMillan. 2015.

Alberts, B.; Johnson, A.; Lewis, J.; Raff, M.; Roberts, K.; Walter, P. Molecular biology of the cell. Garland science, 5ª ed., 2008.

Cooper, G.M. and Hausman, RE. The Cell. A molecular approach. Washington D.C. and Sunderland, 2007.

- Supplementary bibliography

Arthur Lesk Introduction to Protein Science. Architecture, Function, and Genomics Third Edition. Oxford Uni 2016

- Teaching resources

7. Methodology

DIRECTIONS: The course will combine theoretical sessions with seminars and practical laboratory sessions.

8. Scheduling activities

Week	Lecturer	Activity in the classroom Grouping/type of activity	Activity outside the classroom Grouping/type of activity	Session
Week 1 (19/09/2016 to 25/09/2016)	Mireia Olivella	Lecture Class 1 (2h)		Introduction to Biology. Macromolecules in living organisms.
	Mireia Olivella	Lecture Class 2 (2h)		
Week 2 (26/09/2016 to 2/10/2016)	Mireia Olivella	Lecture Class 3 (2h)		Macromolecules in living organisms.
	Mireia Olivella	Lecture Class 4 (2h)		
	Mireia Olivella		Seminar 1 (2h)	
Week 3 (3/10/2016 to 9/10/2016)	Mireia Olivella	Lecture Class 5 (2h)		Macromolecules in living organisms.
	Mireia Olivella		Seminar 2 (2h)	
	Mireia Olivella		Seminar 3 (2h)	
Week 4 (10/10/2016 to 16/10/2016)	Mireia Olivella		Seminar 4 (2h)	Macromolecules in living organisms.
	Lucas Carey	Lecture Class 6 (1h)		
	Lucas Carey	Lecture Class 7 (1h)		
	Lucas Carey	Lecture Class 8 (1h)		
Week 5 (17/10/2016 to 23/10/2016)	Mireia Olivella	**Exam 1: Macromolecules**		Cell Biology
	Lucas Carey	Lecture Class 9 (1h)		
	Lucas Carey	Lecture Class 10 (1h)		
	Lucas Carey	Lecture Class 11 (1h)		
	Lucas Carey		Practice 1 (3h)	

Week 6 (24/10/2016 to 30/10/2016))	Lucas Carey	Lecture Class 12 (1h)		Cell Biology
	Lucas Carey	Lecture Class 13 (1h)		
	Lucas Carey	Lecture Class 14 (1h)		
	Lucas Carey		Practice 2 (3h)	
Week 7 (31/10/2016 to 6/11/2016)	Lucas Carey	Lecture Class 15 (1h)		Cell Biology Introduction to Genetics
	Lucas Carey	Lecture Class 16 (1h)		
	Lucas Carey	Lecture Class 17 (1h)		
	Lucas Carey		Practice 3 (3h)	
Week 8 (7/11/2016 to 13/11/2016)	Lucas Carey	Lecture Class 18 (1h)		Introduction to Genetics
	Lucas Carey	Lecture Class 19 (1h)		
	Lucas Carey		Seminar 5 (2h)	
Week 9 (14/11/2016 to 20/11/2016)	Mireia Olivella	Lecture Class 21 (2h)		Metabolism
	Mireia Olivella	Lecture Class 22 (2h)		
Week 10 (21/11/2016 to 27/11/2016)	Mireia Olivella	Lecture Class 23 (2h)		Metabolism
	Mireia Olivella		Seminar 6 (2h)	
Week final exams		**Exam 2: Cell Biology and Genetics** **Exam 3: Metabolism**		

La còpia i/o plagi total o parcial als treballs i/o exàmens comportarà suspendre l'assignatura amb una qualificació de zero sense dret a recuperació, sense perjudici de l'aplicació de les altres sancions previstes al Reglament de Règim disciplinari dels estudiants de la Universitat Pompeu Fabra en funció de la gravetat de la infracció.

La copia y/o plagio total o parcial en los Trabajos y/o exámenes comportará suspender la asignatura con una calificación de cero sin derecho a recuperación, sin perjuicio de la aplicación de las otras sanciones previstas en el Reglamento de Régimen disciplinario de los estudiantes de la Universitat Pompeu Fabra en función de la gravedad de la infracción.

Total or partial copy and/or plagiarism will imply a failure in the subject with a final grade of zero points and no access to the make-up exam. According to the academic regulations specified in the Disciplinary rules for students of Universitat Pompeu Fabra, other additional sanctions may apply depending on the seriousness of the offence.