

## SYLLABUS

Course 2015-2016

### 1. DESCRIPTION OF THE SUBJECT

<b>Degree:</b>	<b>Biotechnology</b>
<b>Doble Degree:</b>	
<b>Subject:</b>	<b>Genetic engineering</b>
<b>Módulo:</b>	<b>Biochemistry and Molecular Biology</b>
<b>Departament:</b>	<b>Biología Molecular e Ingeniería Bioquímica</b>
<b>Course:</b>	<b>2014-2015</b>
<b>Semestre:</b>	<b>First Semestre</b>
<b>Crédits:</b>	<b>6</b>
<b>Course:</b>	<b>2º</b>
<b>Character:</b>	<b>Obligatory</b>
<b>Language:</b>	<b>English</b>

<b>Model:</b>	<b>B1</b>	
<b>a. Basic Teaching (EB):</b>		<b>60%</b>
<b>b. Practical Teaching(EPD):</b>		<b>40%</b>
<b>c. Driven activities (AD):</b>		

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### 2. Teaching team

#### 2.1. Responsable of the subject: Manuel J. Muñoz Ruiz

<b>Name:</b>	<b>Manuel J. Muñoz Ruiz</b>
<b>Center:</b>	<b>Facultad de Ciencias Experimentales</b>
<b>Department:</b>	<b>Biología Molecular e Ingeniería Bioquímica</b>
<b>Area:</b>	<b>Genetics</b>
<b>Professional Level:</b>	<b>Profesor Titular</b>
<b>Horario de tutorías:</b>	<b>Monday from 10:00 to 12:00 and Friday from 10:00 to 12:00</b>
<b>Office:</b>	<b>22.2.19</b>
<b>E-mail:</b>	<b>mmunrui@upo.es</b>
<b>Telephone:</b>	<b>954349387</b>

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### 3. CONTENT OF THE SUBJECT (TOPICS)

#### ENSEÑANZAS BÁSICAS

**Unit 1. Basic concepts and history of Genetic Engineering.** Definition of Genetic Engineering. Origin, aim, tools and basic technics.

**Unit 2. Purification and analysis of nucleic acids.** DNA and RNA purification, Quantification of nucleic acids. Electrophoresis. Pulse field Electrophoresis. DNA labelling. Hybridization. Southern. Northern and DNA Sequencing.

**Unit 3. Enzymes to manipulate the DNA.** Nucleases. Restriction enzymes, Types and characteristics. Ligase. Polymerases. Modification enzymes, Topoisomerase.

**Unit 4. Bacterial vectors. Strategies for cloning and recombinant identification.** Characteristics and applications of the most usual bacterial vectors. Plasmids, bacteriophages, cosmids, fomsids and BACS. Detection of recombinants.

**Unit 5. Cloning and expression vector of Eukaryote.** Fungus vectors: YEp, YIp, YRp, YAC, expression vectors. Integration in the chromosome. Detection of transgenics.

**Unit 6. DNA libraries.** Genomic and coding DNA libraries. Features and limitations. Construction of a library. Clon identification.

**Tema 7. PCR and its variants.** Polymerase change reaction. Polimerases types. PCR product purification. Cloning PCR fragments. Nested PCR. PCR variants: RT-PCR, RACE, MOPAC, PCR largas, PCR cuantitativa, DD-PCR.

#### LAB CLASES

**Lab class 1.** Cloning of DNA fragments in a bacterial vector.

**Lab class 2.** PCR Mutagenic.



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### 4. METHODOLOGY

The teaching will include face to face teaching with online support and two sessions of lab classes

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### 5. EVALUACIÓN

February evaluation:

The evaluation of EB will be 80% of the total score and it will be considered as indicated:

1. An exam in february that will be the 50% of the total score. The exam will consist in resolution of problems (40%) to show the ability of the student of using the concepts and small test of knowledge (10 %).
2. Two test during the course that can be completed either at home or at class. 20% of the total score.
3. Review of a Genetic Engineering technic presented in Youtube. (10%).

Eh evaluation of the EPD will be 20% of the total score (10% each). This will be consist in a test at the end of each lab class session.

To pass the subject you will need to have a score of 4 in the EB or superior.

Questions in class: During the class, the professor could ask a question that will score 0,25 that will be added to the final score.

July evaluation:

The student that did not pass the exam in February can have an exam in July which will include all the material of EB and EPD.



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### 6. BIBLIOGRAFÍA GENERAL

There is not a book that include all the content of the material of this course. The next texts can be used as a guide:

**Principles of Gene Manipulation and Genomics.** Sandy Primrose, Richard Twyman, Bob Old, Giuseppe Bertola

**Gene Cloning and DNA Analysis: An Introduction.** Terry Brown

**Samnbrook and Russell. "Molecular cloning a laboratory manual", CSHL press 2001**

**An Introduction to Genetic Engineering.** Desmond S. T. Nicholl

**The Hope, Hype, and Reality of Genetic Engineering: Remarkable Stories from Agriculture, Industry, Medicine, and the Environment.** John C. Avise

**Introduction to Biotechnology and Genetic Engineering.** A.J. Nair

**Gene Cloning and Manipulation.** Christopher Howe

**Brown T.A. "Genomes 2". Bios scientific publishers 2002.**

**Lewin B. Genes VII.** Marbán, cop. 2003.

**Jiménez y Jiménez. "Genética Microbiana". Síntesis 1998.**

**Marí-Beffa y Jennifer Knight. "Key experiments in practical developmental biology"**