



Teachers' guide – summary sheet

Initial Identification details:

Title:	Degree in Biotechnology (Plan 2009)		
Faculty/School:	Bio-Health Sciences		
Course subject:	Integrated Laboratory II		
Type (3):	Obligatory	Credits ECTS:	6
Year / Semester (4):	2nd Year-4th Semester	Code (1):	2028
Subject (2):	Practicum		
Module (2):	Experimental Methods in Biotechnology		
Language (5):	Spanish		
Total number of hours undertaken by pupil (6):	150		

Brief description of the course (7):

Integrated Laboratory Course II firmly intends to train students in laboratory work to enable better access to employment and strengthen the theoretical grade. This course is made up of practices designed like real laboratory experiments, in which content and techniques are applied to various subjects in the second year, and will take place in the teaching laboratories of the University Francisco de Vitoria.

Prior knowledge (8):

That pertaining to the degree.

General objective (9):

Acquiring skills in management and development of basic techniques specific to a laboratory in which they apply concepts that cover various subjects. Develop skills of observation, evaluation of results, organization and practical application of theoretical concepts as well as safe work habits in the laboratory.

Skills / Abilities:

General (10):

Acquire a solid technological and humanistic necessary for the development of the profession.
Promoting the thirst for knowledge as a key tool in the process of personal and professional growth of students.
Develop skills of oral and written communication.
Understand the principles and fundamental laws of physics, mathematics, chemistry and biology as the basis of the mental structure of biotechnologist.
Acquire the skills required for experimental work: implementation, collection of results and drawing conclusions, understanding the limitations of the experimental approach.
Acquiring the ability to think analytically, synthetically, reflectively, critically, theoretically and practically.
Knowing how to plan time effectively.
Develop the capacity and commitment of learning.

Specific (10):

Properly organize and plan work in the laboratory.
Identify and define instruments and laboratory materials.
Work properly in a laboratory with biological material (bacteria, fungi, viruses, animal and plant cells, plants and animals) including security, handling and disposal of biological waste.
Ability to apply instrumental techniques commonly used in a biotechnology lab experiments, chromatography, electrophoresis, absorption cytometry, purification and quantification of macromolecules, centrifugation, etc.
Understand the mathematical physicist fundamentals of the basic instrumental techniques used in biotechnology laboratory experimentation.
Know how to design and implement adequately an experimental protocol from the knowledge of different subjects.
Able to describe, quantify, analyze and critically evaluate the results of experimental work in the laboratory.
Know and apply rules and general principles of health and safety in laboratories.
Develop habits of rigorous thought.
Ability to communicate orally and in writing the acquired knowledge.
Being able to self-evaluate the foreground.
Know how to apply theoretical knowledge to problem solving and case studies related to various subjects.
Learn teamwork and coordinated effectively.

Brief index to subjects (12):

- Rationale and management of the spectrophotometer.
- Thin Layer Chromatography (TLC).
- Poly-acrylamide gel electrophoresis under denaturing conditions(SDS-PAGE) and non-denaturing.
- Applications of basic instrumental techniques.
- Chemical kinetics.
- Enzymatic assays.
- Macroscopic and microscopic observation of bacteria and yeast.
- Study of biochemical and metabolic characteristics of microorganisms.
- Testing of classical genetics in different systems.

- Analysis of the human karyotype. Ideograms.
- Studies of population genetics.
- Extraction, purification and handling of genomic and plasmid DNA of microorganisms.
- Amplification of polymorphic locus using PCR.
- Horizontal transfer of genetic information.

Teaching Activities (13) (Approximate % as a function of total credits, considering solely those activities where the student's presence is required and that these represent between 30% and 40%)

Theory classes:	0%
Practical Classes:	86.8%
Workshops/Labs/Presentations:	4.7%
Others:	8.5%
Total:	100%

Evaluation system:

Examinations:	32%
Assistance and participation:	45%
Course work:	15%
Others:	8%
Total:	100%

Specifics of evaluation (14):

The percentages of the evaluation system will apply whenever the student is submitted for consideration and has obtained a grade of at least higher than 4 out of 10. Attendance at all practice sessions, seminars as well as laboratory, is required to pass the course. Participation in practical classes will be evaluated continuously.

Basic bibliography (15):

- García Segura, JM., Gavilanes, JG., Martínez del Pozo, A., Montero, F., Oñaderra, M. y Vivanco, F. (1996). *Técnicas Instrumentales de Análisis en Bioquímica*. Síntesis, Madrid.
- Freifelder, D. (1992). *Physical Biochemistry: Applications to Biochemistry and Molecular Biology*. W.H. Freeman & Co.; Barcelona.
- Sambrook, J., Fritsch, EF., Maniatis, T. (1989). *Molecular cloning. A laboratory manual*. Cold Spring Harbor Laboratory Press; New York.
- Wilson, K. and J. Walker (2000). *Principles and Techniques of Practical Biochemistry*. 5th ed. Cambridge University Press.
- Griffiths, AJF., Wessler, SR., Lewontin, RC., Carroll, SB. (2008). *Introduction to Genetic Analysis*. 9th ed. W.H Freeman, New York.
- Klug, WS., Cummings, MR., Spencer, C. (2008). *Concepts of Genetics*. 9th ed. Addison Wesley-Benjamin Cummings.
- Garrido Pertierra, A. (2009). *Bioquímica metabólica: conceptos y test*. 3ª ed. Tebar, Madrid.
- Brown, A. (2008). *Benson's Microbiological Applications: Laboratory Manual in General Microbiology*. Short Version. 9th ed. McGraw-Hill.
- Cullimore, D. R. (2010). *Practical Atlas for Bacterial Identification*. 2nd ed. CRC Lewis Publication. Boca Raton.

- (1) Code of the course
- (2) Description as per the Verified Memorandum
- (3) May be either: Basic Teaching, Obligatory, Optional, External Practices, or Final Degree Work.
- (4) May be either: First Year - 1st semester and (or) 2nd semester; Second Year - 3rd semester and (or) 4th semester; Third Year - 5th semester and (or) 6th semester; Fourth Year – 7th semester and (or) 8th semester.
- (5) The language in which the course will be taught
- (6) The total number of hours that the student will dedicate to the course. Being approximately twenty-five hours for each ECTS, accounting for all activities.
- (7) Between three and five phrases that summarize the description of the course.
- (8) Corresponds to those recommendations to aid taking the course. A brief recommendation is written. If they are not required, one specifies "those corresponding to the degree".
- (9) Set out the general objective of the course, writing a sole objective.
- (10) The skills as set out in the Verified Memorandum along with the abbreviations corresponding to each of them
- (11) One can add various other skills that are not in the Verified Memorandum and which the teacher deems relevant
- (12) The main thematic blocks of the course
- (13) In this case neither tutorials nor evaluations are included. Only those activities where the student is present.
- (14) Explain the process of evaluation that has been set out previously in percentages with three brief phrases
- (15) Three to ten references should be detailed.

