UNIVERSIDAD FRANCISCO DE VITORIA
VINCE IN BONO MALUM

Teachers' guide – summary sheet

Initial Identification details:

Title:	Degree in Biotechnology (Plan 2009)
Faculty/School:	Bio-Health Sciences
Course subject:	**Biochemical Engineering**
Type (3):	Obligatory
Credits ECTS:	6
Year / Semester (4):	2nd Year-4th Semester
Code (1):	2027
Subject (2):	Engineering of biotechnological processes
Module (2):	Biotechnological tools
Language (5):	Spanish
Total number of hours undertaken by pupil (6):	150

Brief description of the course (7):

Biochemical Engineering is the discipline devoted to the development design, operation and maintenance of processing units that are involved in living organisms or molecules. With the teaching of the course in Biochemical Engineering the biotechnology degree intends that that students acquire the necessary knowledge and learn the basic tools that allow you to understand the basics of transport phenomena and enzymology, essential to be able to describe and understand biotechnological processes.

Prior knowledge (8):

The student studying the field of Biomedical Engineering will make optimal use of the subject if you have the knowledge level of Year 1 degree in the biotechnology for the subjects of Mathematics, Physics, General Chemistry and Fundamentals of Biochemistry and 2 º year of the degree in materials, Metabolic Biochemistry and Microbiology I

General objective (9):

Know and understand the fundamentals of transport phenomena and enzymology and be able to describe and understand the biotechnological processes.

Skills / Abilities:

General (10):

Acquire a solid theoretical, practical, technological and humanistic training necessary for professional development activity.
Promoting the thirst for knowledge as a key tool in the process of personal growth and professional student.
Develop the ability to search, assimilation, analysis, synthesis and informational relationship.
Know the principles and basic tenets of the experimental sciences and humanities
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: design, implementation, collection results and drawing conclusions, understanding the limitations of the approach experimental.
Acquire more advanced knowledge of biochemistry and molecular biology necessary for development of biotechnological products and processes.
Acquire the knowledge essential for engineering design and scale of the instruments necessary for the development of a biotechnological process.
Ability to work as a team and manage groups.
Acquiring the ability to think analytically, synthetically, reflectively, critically, theoretically and practically.
Capacity for problem solving and decision making.
Knowing how to plan time effectively.
Develop the capacity and commitment of own learning and personal development.

Specific (10):

Calculate and interpret correctly the relevant parameters in transport phenomena and mass and energy balances in bio-industrial processes.
Acquire the technological and engineering expertise needed to design processes.
Properly organize and plan work in the laboratory.
Identify and define instruments and laboratory materials.
Be able to describe, quantify, analyze and critically evaluate the results of experimental work in the laboratory.
Develop habits of rigorous thought.
Ability to communicate orally and in writing the acquired knowledge.
Analyze and synthesize ideas and main contents of all kinds of texts, to discover the theories contained in them and the issues raised, and to judge critically about their form and content.
Know how to apply theoretical knowledge to problem solving and case studies related to various subjects.
Learn teamwork and coordinated effectively.
Being able to self-evaluate the foreground.

Complementary (11):

Being able to get the dimensionless groups that describe a given biotechnological process.
Know and be able to apply the theory of similarity.
Understand the meaning of the kinetic parameters that describe an enzymatic process.
Being able to interpret and obtain the kinetic parameters associated with an enzymatic reaction.

Know and understand the factors affecting the enzymatic activity of proteins.

Brief index to subjects (12):

Block Fluid Mechanics:
- Item 1. Essential mathematical tools in chemical engineering
- Item 2. Reactor design and scale, dimensional analysis
- Item 3. Chemical Engineering: fluid mechanics
- Item 4. Transfer balances energy and momentum
- Item 5. Balance-transfer

Block Enzymology:
- Item 6. Enzyme kinetics
- Item 7. Mechanism of action of enzymes
- Item 8. Purification, characterization and assessment of enzymatic activities
- Item 9. Immobilized enzymes
- Item 10. Application of biocatalysts in biotechnology

Laboratory practicals

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:	65%
Practical Classes:	30%
Workshops/Labs/Presentations:	5%
Others:	0%
Total:	100%

Evaluation system:

Examinations:	60%
Assistance and participation:	5%
Course work:	5%
Others:	30%
Total:	100%

Specifics of evaluation (14):

- Written exam consisting of short questions to develop and solve practical cases and problems: 60%
- Participation in the development of classes: 5%
- Preparation and submission: 5%
- Preparation and presentation of exercises and case studies: 15%
- Implementation for practical work in the laboratory: 15%

Basic bibliography (15):

- Lee, JM. (2003). *Biochemical Engineering*. 6a ed. Prentice Hall, Upper Saddle River (New Jersey).
- Schuler, ML., Kargi, F. (2002). *Bioprocess Engineering. Basic Concepts.* Prentice Hall, Upper Saddle River (New Jersey).
- Atkinson, B. (2002). *Reactores Bioquímicos*. Reverté D.L., Barcelona.
- Price, NC., Stevens, L. (2000). *Fundamentals of Enzymology*. Oxford University Press, Oxford.
- Blanch, HW., Clark, DS. (1997). *Biochemical Engineering*. Prentice Hall, Upper Saddle River (New Jersey).
- Bailey, JE., Ollis, DF. (1986). *Fundamentals of Biochemical Engineering*. Mc Graw-Hill, New York.

(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.

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