UNIVERSIDAD FRANCISCO DE VITORIA
VINCE IN BONO MALUM

Teachers' guide – summary sheet

1. IDENTIFICATION DETAILS

Title:	Degree in Biotechnology (Plan 2009)
Faculty/School:	Bio-sanitary Sciences
Course subject:	**Bioinformatics**
Type:	Obligatory
Credits ECTS:	6
Year / Semester:	Year Three – 5th semester
Code:	2031
Subject:	Advanced Technology in Biotechnological Training
Module:	Tools of Biotechnology
Language:	Spanish
Total number of hours undertaken by pupil:	150

2. DESCRIPTION OF THE COURSE

Bioinformatics is a discipline based on the application of computational methods and information technologies in the field of biology to increase understanding of biological processes. Information processing and molecular genetics has become a central issue in the current biomedical research and biotechnology. Bioinformatics provides methods, tools and systems that allow researchers and biotechnologists in their work to integrate the information derived from advances in molecular biology, genomics and post-genomics research.

3. SKILLS TO DEVELOP

3.1. General skills

Acquire a solid technological and humanistic background necessary for the development of professional activity.
Encourage the concern of knowledge as a key tool in the process of personal and professional growth of the student.
Develop the ability to search, assimilation, analysis, synthesis and mutual exchange of information.
Develop habits of oral and written communication.
Acquire knowledge of biochemistry and molecular biology necessary for the development of biotechnological products and processes.
To apply theoretical, practical and human knowledge, acquired at university to practical work in

research centers and biotech companies.
To know the applications of biotechnology in the fields of health, food, biotech crop, environmental and chemical industries.
Acquire the capacity of analytical, synthetic, reflective, critical, theoretical and practical thinking.
Capacity for problem solving and decision making.
Knowing how to plan time effectively.
Valuing of science as a cultural fact.
Recognizing the mutual influence between science, society and technological development to ensure a sustainable future.
Develop the capacity and commitment of their own learning and personal development.

3.2. Specific skills

Know and understand the applicability of multidisciplinary techniques including concepts of protein chemistry, mass spectrometry, protein processing and handling, biostatistics and bioinformatics.
Define and be able to apply genetic engineering techniques to study gene expression and function in different systems, as well as manipulation and modulation of gene expression.
Knowing and applying new genomic techniques to the fields of medicine, biology, pharmacy and agriculture.
Learn and know how to apply the classical techniques of chemical analysis of proteins.
Knowing the set of technologies and experimental strategies used for mass analysis and quantification of proteins.
Knowing and understanding the structure and function of enzymes and their applications in the biotechnology industry.
Know the main methods of chemical modification of biomolecules and the applications of these bioactive molecules in the various fields of biotechnology.
Develop habits of rigorous thought.
Ability to communicate orally and in writing the knowledge acquired.
Analyze and synthesize ideas and main contents of all texts, to discover the arguments contained in them and the issues raised, and to judge critically on their form and content.
Apply the acquired knowledge to solving practical problems and cases relating to different subjects.
Being able to self-assess the knowledge acquired.
Ability to work effectively and coordinately in teams

3.2. Complementary skills

Knowing the history and evolution of Bio-informatics (BI), their different approaches and concepts and basic tools that drive.
Acquire the skills necessary to represent, transform, retrieve, compare and align biological sequences.
Perform multiple sequence alignments and apply evolutionary phylogenetic study.
Learn methods and tools for searching and computational gene prediction
Know the methods, techniques, tools and information sources for the study of RNA.
Know the main methods, tools and information resources to help large sequencing projects (annotation, assembly, STD, STS ...) and experiments in molecular biology (PCR).
Know the methods, techniques, tools and information sources for the study of proteins, both from the point of view of their sequence, as its structure and function.

4. PRE-REQUISITES

Office and familiarity with computers and their applications more frequently.
Fundamentals of molecular biology
Experimental techniques used in molecular biology that serve as a source of data for analysis and interpretation using bioinformatic techniques.

5. WORK TIME DISTRIBUTION

CONTACT HOURS	REMOTE STUDY HOURS
60	90

6. OBJECTIVES

Acquire the most important notions in relation to the discipline Bioinformatics (BI) and its applications in biotechnology and know and use databases and bioinformatics tools to support research, development and innovation in Molecular Genetics and Genomics.

7. INDEX OF SUBJECTS

Bioinformatics is a discipline with a body of research itself and about developments towards application to support research in other areas such as biotechnology: biology, pharmacy or medicine.
This course will analyze the major applications of bioinformatics as a support tool for the storage, management and analysis and interpretation of experimental results. The areas covered by the agenda are:
- Database for storing and retrieving information about biomolecules.
- Tools and techniques for analyzing biological sequences:
- Tools and techniques for analyzing genomic data and post genomics (functional genomics, proteomics, metabolomics, ...).

8. METHODOLOGY/LEARNING ACTIVITIES

The methodology of this course is structured around the presentation of theoretical foundations which underpin the development and bioinformatics applications and some practical activities with the computer and performing any work by which students will visit, meet, become acquainted and learn to properly exploit the resources and methods described in the theoretical part.

9. EVALUATION SYSTEM

The methodology for the assessment of learning by students is a combination between a theoretical examination of the content presented on the subject and the activities undertaken by students in tests and practicals. Given the nature of the subject, the evaluation of the practice will be very important realization being essential for passing the subject.

10. BIBLIOGRAPHY

Mount, D.W. 2004. *Bioinformatics : Sequence and Genome Analysis*. 2nd edition. Cold Spring Harbor Laboratory Pr; ISBN: 0879695978
Claverie, JM. and Notredame C. 2006. *Bioinformatics for Dummies.* John Wiley & Sons Inc. ISBN:0470089857
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The NCBI Handbook. Accesible en Internet: http://www.ncbi.nlm.nih.gov/books