



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: **Metabolic biochemistry**

Type (3): Basic Teaching

Credits ECTS: 6

Year / Semester (4): 2nd Year-3rd Semester

Code (1): 2021

Subject (2): Biochemistry

Module (2): Fundamental Sciences

Language (5): Spanish

Total number of hours undertaken by pupil (6): 150

**Brief description of the course (7):**

The course will focus in terms of content on the study of all chemical reactions and other physical and chemical processes (metabolic pathways) that occur within the uni- or multi-cellular organisms. These reactions constitute the basis of life at the molecular level and allow every cell to carry out vital processes such as nutrition and growth. These processes or metabolic pathways will be studied from the viewpoint of those for the generation of energy in its various forms (catabolism) and from the point of view of those for the generation of macro-molecules (anabolism).

**Prior Knowledge (8):**

To successfully address the subject it is necessary to have a basic understanding of the nature, composition and structure of key bio-molecules involved in metabolic pathways to be studied. It would therefore be desirable that the student had successfully completed the course on Fundamentals of Biochemistry. Looking to understand the mechanisms of chemical reactions taking place on these routes is important that the student possesses knowledge and therefore has passed the corresponding subject of Organic Chemistry.

**General objective (9)**

The overall objective of the course is to enable students to learn and understand what chemical reactions are responsible for the maintenance of cell life and how these responses are interrelated with each other to achieve precise control of each of the processes needed for life.

## Skills / Abilities:

### General (10):

Acquire knowledge of biochemistry and molecular biology for the development of biotechnological products and processes.  
Promoting the restlessness for knowledge as a key tool in the process of personal and professional growth for students.  
Develop the ability to search, assimilation, analysis, synthesis and relationship of information.  
Acquiring the ability to think analytically, synthetically, reflectively, critically, theoretically and practically.  
Knowing how to plan time effectively.  
Develop the capacity and commitment for own learning and personal development.

### Specific (10):

Understand and know the basics of biochemistry and molecular biology to address biological and physiological processes of living organisms.  
Recognize the structural and functional characteristics of macro-molecules from a solid background in biochemistry.  
Describe the metabolic reactions that occur in living organisms and the bioenergetics associated biochemical processes.  
Know how to apply theoretical knowledge to problem solving and case studies related to various subjects.  
Develop habits of rigorous thought.  
Ability to communicate orally and in writing the acquired knowledge.

### Brief index to subjects (12):

- 1) Introduction to Metabolism. Prior concepts. Bioenergetics
- 2) Metabolism of sugars:
  - 2.1. Catabolism: glycolysis, Krebs cycle ...
  - 2.2. Anabolism: Gluconeogenesis, Calvin Cycle ...
- 3) Lipid Metabolism:
  - 3.1. Catabolism: Mobilization of fat oxidation Beta ...
  - 3.2. Anabolism Synthesis of fatty acids, steroids ...
- 4) Metabolism of amino acids and proteins:
  - 4.1. Catabolism: Urea cycle
  - 4.2. Anabolism Synthesis and interconversion of amino acids
- 5) Metabolism of nucleic acids:
  - 5.1. Catabolism: Degradation of nucleic acids, PRPP
  - 5.2. Anabolism Synthesis of purines and pyrimidines
- 6) Integration of metabolism: regulation for metabolism

**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:	54%
Practical Classes:	16%
Workshops/Labs/Presentations:	8%
Others:	22%
Total:	100%

**Evaluation system:**

Examinations:	50%
Assistance and participation:	5%
Course work:	20%
Others:	25%
Total:	100%

**Specifics of evaluation (14):**

The previous section describes the percentages of the final grade to be assigned to each of these points shall be assessed with a view to prove that the student has obtained sufficient performance and a minimum knowledge to pass the course.

**Basic bibliography (15):**

Mathews, CK., Van Holde, KE., Ahern, KG. (200). *Bioquímica*. Pearson-Addison Wesley, Madrid.  
 Voet, D., Voet, J. (2004). *Biochemistry*. 3rd ed. Wiley.  
 Lehninger, A., Nelson, DL., Cox, M. (2008). *Principles of Biochemistry*. 5th ed. W.H.Freeman.  
 Voet, D., Voet, J., Pratt, CW. (2006). *Fundamentos de Bioquímica*. 2ª ed. Panamericana Médica, Buenos Aires.  
 Baynes, JW., Dominiczak, MH. (2006). *Bioquímica Médica*. 2ª ed. Elsevier Mosby, Madrid.  
 Reed, S. (2009). *Essential Physiological Biochemistry*. 1st ed. Wiley-Blackwell.

- (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.