



# Faculté d'ingénierie biologique, agronomique et environnementale

## AGRO

BIR1220

**Biochemistry I : structural biochemistry, enzymology and molecular biology**

[30h+15h exercises] 3.5 credits

This course is taught in the 2nd semester

**Teacher(s):** Michel Ghislain, Yvan Larondelle  
**Language:** french  
**Level:** 1st cycle course

### Aims

The goals aimed by this biochemistry course is to describe the essential macromolecules present in living organisms and to explain the principles governing the interactions between the biomolecules. Special emphasis is put on protein catalysis and biosynthesis.

### Main themes

1. To recall and emphasise the molecular logic of living organisms.
2. To describe the major biomolecules present in living cell.
3. To detail protein structure and enzyme reaction.
4. To explain the molecular mechanisms underlying DNA replication and protein biosynthesis.

### Content and teaching methods

The course is divided in four theoretical parts (A to D) and one practical training.

A. Introduction to the molecular logic of life: structural hierarchy in the molecular organization of living cells, energetic basis of metabolism and importance of water. B. Biomolecules and their monomeric subunits: classification, structure, properties and functions of the amino acids, proteins, carbohydrates, lipids and nucleic acids. Protein three-dimensional structure and protein purification methods are highlighted. A special focus is also put on cell membranes and walls. C. Enzymology : classification, enzyme kinetics, reaction mechanisms, principles underlying the regulation of enzymatic reactions. D. Fundamentals of molecular biology : the biochemistry of DNA replication, RNA transcription and protein synthesis. E. Measurement of protein concentration and enzyme activity (determination of kinetic parameters and inhibition); computational simulation of protein chromatography and experimental illustration of protein electrophoresis; overview of properties of carbohydrates or lipids or nucleic acids.

### Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Precursory course : A basic training in general biology and organic chemistry is required.

Evaluation : Written examination with possibility of oral interview

Support : The textbook used is the newest edition of the " Lehninger : Principles of Biochemistry " (2000). In addition, the students have access to soft and hard copies of the Microsoft PowerPoint presentations given by the teachers.

Framing : Teaching team composed of professor and assistants, all specialised in biochemistry.

### Other credits in programs

<b>BIR12</b>	Deuxième année du programme conduisant au grade de candidat bio-ingénieur	(3.5 credits)	Mandatory
--------------	---	---------------	-----------