



UNIVERSITY "ISMAIL QEMALI" VLORE
FACULTY OF TECHNICAL AND NATURAL SCIENCES
DEPARTMENT OF BIOLOGY

COURSE PROGRAM BIO 232 BIOCHEMISTRY

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| Subject: | Biochemistry |
| Head/Teacher of the subject: | MSc. Xhuljana Arapaj |
| Charge: | 3-hour lecture, 2-hour seminar |
| Subject typology: | Interdisciplinary/integrative subject |
| Academic year/semester when it takes place: | 2022-2023/ Fall 2022 |
| Subject type: | Mandatory |
| Study program: | Bachelor Biology |
| Credits: | 8 credits |
| Subject code: | BIO 232 |
| E-mail address of the holder/pedagogue: | xhuljana.arapaj@univlora.edu.al |

SUMMARY AND LEARNING OUTCOMES:

Students in the Biochemistry subject will gain knowledge on: The main features of the chemical components of cells, the classification method and the characteristics for each class, such as carbohydrates, lipids, nucleic acids, etc. They will learn the main metabolic pathways according to cell types and the metabolic pathways of the breakdown of different substances, such as glycolysis, fermentation, respiration, B-oxidation, and photosynthesis.

BASIC CONCEPTS:

- 1 To know the chemical components of the cell
- 2 To know cellular metabolism and cell biochemistry
- 3 To know different pathologies that have their origins in biochemical problems.

COURSE TOPICS:

Topics to be covered in the lectures:

- Topic 1** Biochemistry facility. Inorganic components, biochemical data.
- Topic 2** Water, chemical structure, properties, importance for the human organism. pH of the organism. Cell membrane.
- Topic 3** Transport across the cell membrane. Classification of proteins. Amino acids.
- Topic 4** Peptides, proteins, protein structures. Physical and chemical properties of proteins.
- Topic 5** Chemical bonds in proteins. Denaturation of proteins. Composite proteins. Construction of DNA and RNA.
- Topic 6** Colored proteins. Carbohydrates. Importance, composition, classification.
- Topic 7** Monosaccharides. Disaccharides. Polysaccharides. Lipids. Simple lipids.
- Topic 8** Complex lipids. Enzymes. Vitamins. Water-insoluble vitamins.
- Topic 9** Water soluble vitamins. Basic energy concepts. Metabolism of substances. Glycolysis.
- Topic 10** Electron transport and H^+ (oxidative phosphorylation). The Krebs cycle.
- Topic 11** β -oxidation of fatty acids. Nitrogen catabolism of amino acids. Heme catabolism.
- Topic 12** Carbohydrate biosynthesis. Biosynthesis of fatty acids. Biosynthesis of amino acids.
- Topic 13** Hemoglobin biosynthesis. Nucleic acids and protein synthesis. Duplication of DNA.
- Topic 14** Blood biochemistry. Blood coagulation. The acid-base balance of the organism. Blood buffer systems.
- Topic 15** Urine. Neurotransmitters. Hormones. Chemical construction. Classification. Immunoglobulins.

Topics to be covered in the seminars:

- Topic 1** Biochemistry facility. Inorganic components, biochemical data.

- Topic 2** Water, chemical structure, properties, importance for the human organism. pH of the organism. Cell membrane.
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FORM OF KNOWLEDGE CONTROL

| control | Percentage rating |
|-----------------------------|-------------------|
| Control I | 30% |
| Annual assessment: Seminars | 10% |
| Final check | 60% |

Grading is based on the conversion of the total grade to %, grade 5-10 progressively 41-100%.

| Grading | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------------|-----|-------|-------|-------|-------|-------|--------|
| ASSESSMENT | -40 | 41-50 | 51-60 | 61-70 | 71-80 | 81-90 | 91-100 |

ATTENDANCE:

The student, who results in less than 75% attendance for the period that belongs to each partial exam, the period for which he will be tested, will not be included in the corresponding exam, will be evaluated with M. If the student attended the course, but did not before the next exam, it is graded NP (Not Appeared).

COURSE FORMAT:

The subject will be evaluated on the basis of a partial exam, assignments and the final exam. Points earned will be cumulative. The exams will not be repeated, for any reason. If you miss an exam without any major reason, then you will lose points for that exam that you did not appear for.

LITERATURE

a) Mandatory basic literature:

Kicaj, H, Kasemi, D, Shahollari, B. (2014). biochemistry, *Euoprint*, ISBN 978-99956-95-06-4

b) Recommended literature:

Bettelheim, F., & Landesberg, J. (1991).

Laboratory Manual for General, Organic & Biochemistry. Harcourt School.

Berg, JM, Tymoczko, JL, & Stryer, L. (2002). Biochemistry, ; WH

Harvey, RA, & Ferrier, DR (2011). Biochemistry. Lippincott Williams & Wilkins.

Lecturer

MSc. Xhuljana Arapaj