COURSE OUTLINE

(1) GENERAL

SCHOOL	Health Sciences		
ACADEMIC UNIT	Faculty of Medicine		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**IAY303**	**SEMESTER**	**B (2nd)**
COURSE TITLE	Biochemistry I		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures and laboratory exercises	6	7
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes/English
COURSE WEBSITE (URL)	http://ecourse.uoi.gr/enrol/index.php?id=43

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Students are expected to familiarize themselves with the structure and function of key biomolecules and demonstrate an understanding of key concepts, such as that the structures of biomolecules serve their function and that the cellular functions have evolved based on the properties of molecules. In this context, it is important for the students to consolidate that both the qualitative changes in the sequence and architecture of biomolecules and the quantitative deregulation of gene expression are fundamental processes constituting the molecular basis of modern medicine. They are also expected to gain a practical experience in basic laboratory techniques and data analysis in Biochemistry.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Respect for difference and multiculturalism
- Criticism and self-criticism
- Laboratory experience in basic biochemical techniques

(3) SYLLABUS

- Introduction to Biochemistry**:**
  Molecular design of life. Primordial biomolecules. Physicochemical basis.
- Proteins, protein structure and function:
  Protein structure/function. Amino acids, sequence, primary, secondary, tertiary, quaternary structure. Globular proteins. Fibrous proteins: collagen, keratins. Protein folding. Protein misfolding and degenerative diseases. Experimental methods for protein purification and analysis in research and diagnosis. Hemoglobin, myoglobin. Allosteric regulation. Globin genes, evolution, hemoglobinopathies.
- Enzymes:
  Basic principles, enzyme kinetics, regulation mechanisms. Enzyme reaction cascades: nutrient digestion, blood coagulation.
- Lipids and biological membranes:
  The biological membrane, membrane lipids, membrane proteins. Transmembrane translocation of solutes, transport mechanisms.
- Nucleic acids:
  Nucleic acid structures and topology. Experimental study of nucleic acids and genes.
- Flow of genetic information:
  DNA replication, transcription, translation. DNA polymerase, RNA polymerase. Modified mRNA.
- Biotechnology-Bioinformatics
  Principles of Biotechnology. Study of genes and genomes. Genetic engineering. Principles and applications of Bioinformatics**.**

Objectives
Understanding the molecular design of life through the study of structure-function relationships of key biomolecules (DNA, RNA, proteins, membrane lipids) and biochemical processes (nutrient intake and digestion, oxygen transportation, blood coagulation, DNA replication and repair, protein synthesis) as well as of their connections to human physiology and disease.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Teaching is implemented through lectures (face-to-face teaching) and complementary practical exercises.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint slides and videos are used in the lectures. The powerpoint slides and videos presented, as well as complementary teaching material (links to important research articles or related textbooks, etc.), are freely accessible to the students through the e-course system of the University of Ioannina. The e-course system is also used for updates and communication with the students on several practical aspects of the teaching process or the exams. (see Messages and Forum, in http://ecourse.uoi.gr/enrol/index.php?id=43). E-mail addresses of the teaching staff are made available to students and are freely used as a means of communication. One of the practical exercises (Bioinformatic analysis of DNA sequences) allows education/training of students in the use of relevant databases (UniProt, NCBI, etc.) and software programs (Blast, Chromas, etc.).
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Language of evaluation: Greek Evaluation through written exams (mid-term and final exam or final exam only) Each written exam includes a weighted list of the following types of questions: Short-answer questions Open-ended questions Questions requiring combination of knowledge from different chapters Questions requiring critical thinking/interpretation Multiple-choice or double-choice (yes/no) questions

Activity	*Semester workload*
Lectures	65
Laboratory courses	12
Course total	*77*

(5) ATTACHED BIBLIOGRAPHY

- *Teaching – study material:*

1. J. M. Berg, J. L. Tymoczko, G. J. Gatto Jr., L. Stryer, **Biochemistry**, W. H. Freeman, 9th edition, Crete University Press, 2021 (eudoxus system, code 102074412), ISBN: 978-618-

524-636-5.
2. R. H. Garrett, C. M. Grisham, **Biochemistry**, 6th edition, Cengage Learning, 2016, Utopia Publishing, 2019 (eudoxus system, code 7713116), ISBN: 978-618-5173-40-1.
3. Additional bibliography suggested for further reading can be found at the lesson e-course page: http://ecourse.uoi.gr/enrol/index.php?id=43