Course Title	**Biochemistry II**				
Course Code	ABS106				
Course Type	Compulsory				
Level	BSc (Level 1)				
Year / Semester	1st / 2nd Semester				
Teacher's Name	Dr Kyriacos Kyriacou, Dr Vasilia Tamamouna				
ECTS	6	Lectures / week	3	Laboratories/week	2
Course Purpose	The course aims to complete and strengthen knowledge of Biochemistry for the graduates in Applied Biomedical Sciences, equipping them with a solid background, which will prepare them for the other degree related courses such as Principles of Biomedical Sciences, Biomedical Instrumentation, Molecular Biology and Clinical Chemistry. This purpose is achieved by specifying the knowledge on enzymes such as cytochromes, understanding their mode of action and regulation, as well as molecules such as hemoglobin and chlorophyll and, in addition, on the basis of genetic information transfer. Emphasis is given on the metabolism of biomolecules and their products, as related to health and disease..				
Learning Outcomes	By the end of this course, the students should be able to: **Introduction to metabolism** Recognize and explain the concepts of anabolism and catabolism. Evaluate the biological role of metabolic processes. Familiarise with basic concepts such as: energy, biological oxidation, electron transfer, biomolecular energy transfer (ATP, NADH, FADH2). **Carbohydrate metabolism** Explain carbohydrate metabolism. Describe the processes of glycolysis and gluconeogenesis. Explain the path that pyruvate follows and the reactions in Krebs Cycle. Identify what electron transfer is and the process of oxidative phosphorylation. **Photosynthesis** Identify the dark and light reactions. Explain what chlorophyll is and the role of this molecule in photosynthetic cells. **Metabolism of other biomolecules** Explain the amino acid metabolism and the urea cycle.				

	Explain the lipid metabolism and the formation of ketone bodies. Describe the nucleic acid metabolism. **Metabolic control** Recognize hormones and their receptors. Understand the action of hormones. Distinguish the processes of metabolism in the human body. Understand the importance of analysing metabolites and other biomarkers in terms of disease		
Prerequisites	ABS103	Corequisites	None
Course Content	Theory: Anabolism and catabolism and their biological role. Biological oxidation. Metabolism of carbohydrates, lipids, amino acids and nucleic acids. Stages of glycolysis and gluconeogenesis. Chlorophyll and photosynthesis. Mechanism of electron transfer to the respiratory chain and other systems. Oxidative phosphorylation. Krebs cycle. Glyoxylic acid cycle. Uric Acid. Urea cycle. Creation of ketone bodies. Metabolic control. Hormones and molecules for message transfer. Role of membrane and intramolecular receptors. **Laboratory experiments/exercises:** As part of the course, laboratory exercises are carried out on the course material for a better deepening and consolidation of the theoretical part. Indicative exercises are: laboratory techniques in biochemistry, isolation, qualitative characterization and chemical analysis of proteins, isolation and quantitative analysis of cholesterol, enzymatic metabolism reaction (monitor the activity of various enzymes, Krebs Cycle Enzymatic Action (study the rate and factors that affect enzyme reactions).		
Teaching Methodology	Teaching methodology includes lectures on the theoretical background and laboratory exercises / experiments to better understand concepts of Biochemistry. Detailed lecture notes are presented with image-rich material and short animations are given to help describe/demonstrate several biochemical processes. Students are also introduced to specific databases such as pubmed, Ensembl, etc. During lecture, discussions are carried out and students are encouraged to answer questions and draw their own conclusions. Small exercises are sometimes given, to ticker critical thinking. As part of the developing students' skills, laboratory exercises are carried out by the students themselves in the Laboratory of Biochemistry and		

	Molecular Biology with the proper laboratory equipment and under the supervision of teaching personnel. Appropriate preparation and demonstration by the laboratory personnel precedes each laboratory exercise. Assessment of laboratory includes the evaluation of lab reports submitted by each student after each laboratory exercise.
Bibliography	(a) Textbooks: • Biochemistry. Berg M.J., Tymoczko L.J., Gato G., Stryer L. 9th ed. Publisher: W. H. Freeman, 2019 • Βιοχημεία: Berg M.J., Tymoczko L.J., Stryer L. (Δ. Δραΐνας, Ε. Χατζηλουκάς, Γ.Κ. Παπαδόπουλος, Α. Αλετράς, Α. Κωνσταντίνου, Θ. Βαλκανά, , Η. Κούβελας, Εκδόσεις Πανεπιστημίου Κρήτης), 2017. (b) References: • Βιοχημεία: Lehninger Βασικές αρχές Βιοχημείας: D.L. Nelson, M.M. Cox (Ιατρικές Εκδόσεις Πασχαλίδη, 2η έκδοση) 2018. • Βιοχημεία: Lehninger Βασικές αρχές Βιοχημείας: D.L. Nelson, M.M. Cox (Μετάφραση: Αθ. Παπαβασιλείου, Ιατρικές Εκδόσεις Π.Χ. Πασχαλίδης) Αθήνα 2011.
Assessment	For student evaluation, the overall grade is determined by a written midterm exam (20%), a laboratory grade (20%) and a written final exam (60%). The mid-term exam is carried out between the 6th and 8th week and it mainly includes short answer questions and problem- solving questions to examine specific modules of the course. The laboratory grade is based on the evaluation of the laboratory reports (60% of the laboratory grade) provided by the students for each experiment, and a final laboratory examination (40% of the laboratory grade) which mainly includes short answer questions and problem-solving questions. In the laboratory reports, students are asked to describe the experiment procedure, to evaluate and analyse their results and to answer specific questions. The following criteria are taken into account when evaluating laboratory reports: (a) experimental data collection (30%), (b) data analysis (40%), and application of theory to draw conclusions (30%). The final exam of the course is carried out during the 14th-16th week of each semester and includes short answer questions, decision questions, and problem-solving questions regarding all course modules. The final assessment of the students is formative and summative and is assured to comply with the subject's expected learning outcomes and the quality of the course.
Language	Greek, English