Course Title	**Clinical Chemistry**				
Course Code	ABS301				
Course Type	Compulsory				
Level	BSc (Level 1)				
Year / Semester	3rd / 5th Semester				
Teacher's Name	Dr Despina Charalambous, Dr Panagiotis Kouis				
ECTS	6	Lectures / week	3	Laboratories/week	2
Course Purpose	The course aims to teach and comprehend basic principles of Clinical Chemistry a subject which is highly relevant for graduates of Applied Biomedical Sciences. Also, this course presents and describes chemical and cellular concepts and techniques in the understanding and assessment of human health, with emphasis on chemical analysis of body fluids and other bio-specimens that mirror disease.				
Learning Outcomes	Students are expected to: Recognize and explain what clinical chemistry is and what its role is Explain the basic laboratory principles used in clinical chemistry Learn to communicate with patients /colleagues Familiarize with different types of clinical specimens and basic biological sampling procedures Understand and apply statistics in clinical chemistry Explain the main steps in automated analysis and emphasize usage of biochemical analyzers. Recognize quality assurance in the clinical laboratory and implement and quality control tests performed using an internal reference standard and an external reference sample (ISO 15189 accreditation) Understand and interpret body chemistry levels under normal and abnormal conditions such as: Serum proteins. Water and electrolyte unbalance, acid-base balance, blood gases. Cardiac function, cardiac markers, lipids, lipoproteins. Endocrinology, hormones and assessment of thyroid function. Understand the implementation of the polymerase chain reaction in biochemical analysis (PCR, Real time PCR) Explain DNA sequencing and new generation sequencing techniques. Understand mutation detection techniques and molecular/clinical markers for various diseases (e.g. cancer).				
Prerequisites	ABS103, ABS106	Corequisites	-		

Course Content	Basic principles of laboratory study in Clinical Chemistry. Sampling of biological samples. Statistics in Clinical Chemistry, calculation of reference range. Quality assurance in the Clinical Laboratory. Automation in Clinical Chemistry. Biochemical analyzers. Basic principles of electrophoretic techniques in Clinical Chemistry. Basic principles and applications of immunoassays. Basic principles of Clinical Enzymology. Serum proteins. Water and electrolyte disturbances, acid-base balance, blood gases. Cardiac function, cardiac markers, lipids, lipoproteins. Endocrinology, hormones and assessment of thyroid function. Diabetes. Laboratory assessment of liver function. Tumor markers. Introduction – interpretation to Molecular Diagnostics. Polymerase chain reaction (PCR), Real time PCR, quantitative PCR, RT-PCR, ARMS-PCR, multiplex PCR. DNA sequencing and new generation sequencing techniques. Mutation analysis techniques. Molecular markers of cancer. Accompanying diagnostic tests. <u>Laboratory experiments/exercises:</u> Students will select examples of biochemical cases and work individually under supervision, to follow the course of their selected disorder such as acquired, autoimmune or malignant and become competent in the appropriate biochemical tests that are used.
Teaching Methodology	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. Teaching methodology includes lectures to better understand concepts of Clinical Chemistry. Detailed lecture notes are presented with image-rich material and short animations to help understand better several biological processes. Methods such as discussion, questions/answers and cooperative learning are used to enhance the student's participation. Recent research results are included and discussed in the course. The written assignment helps students to grasp the ideas and concepts presented in the course. It is also used to demonstrate knowledge. As part of the developing students' skills, some 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 is preceded by each laboratory exercise. Assessment of laboratory exercises is performed by submitting laboratory reports or filling out special forms / questionnaires for each student. Students will be hosted in Clinical laboratories where they will be trained and carry out hands on biochemical tests covering both routine and specialized tests, as they are applied in the diagnosis of real life cases.
Bibliography	(a) <u>Textbook:</u> 1. «Clinical chemistry» William Marschall, 9th edition, 2020, Elsevier.

	2. "Κλινική χημεία και μοριακή διαγνωστική", 2020, Σκορίλας Αντρέας, Εκδόσεις Broken Hill LTD (b) <u>References:</u> Basic Concepts in Clinical Biochemistry: A Practical Guide, Vijay Kumar, Kiran Dip Gill, 1 st Edition (2018).
Assessment	The overall grade is determined by a written midterm exam (30%), a written assignment (10%) 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 and examines specific modules of the course. 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