Course Title	**Laboratory techniques in Biomedical Sciences/Professional development**				
Course Code	ABS306				
Course Type	Compulsory				
Level	BSc (Level 1)				
Year / Semester	3rd year / 6th Semester				
Teacher's Name	Dr Despina Charalambous/Charis Charilaou/Dr Kyriacos Kyriacou				
ECTS	6	Lectures / week	2	Laboratories / week	2 plus 8 hours per week for 13 weeks hosting in Clinical Laboratories Total practical training =156 hours
Course Objectives	Biomedical science is an umbrella term that encompasses many disciplines; biochemistry, haematology, immunology, microbiology, histology, cytology, and infectious diseases among many others. Thus, it is important for students to understand these different disciplines and how these integrate to formulate laboratory tests which help in disease diagnosis, in disease monitoring as well as in shaping therapeutic decisions. This course is dedicated to teaching the students the laboratory techniques used in a contemporary Clinical Laboratory. The main objectives of the course are: To provide both the theoretical and practical background on the basic disciplines which comprise Biomedical Sciences. To highlight the basic laboratory techniques used in a Clinical laboratory and teach students the fundamental rules about the use of laboratory protocols To introduce students to the terminology that is used in Biomedical Sciences To demonstrate how the different disciplines and techniques are used to diagnose human diseases using kidney disorders as a prime example.				
Learning Outcomes	At the completion of the course the students will be able to: • Know the different disciplines of Biomedical Sciences and the main techniques which are used for diagnosis Learn the terminology used in Biomedical Sciences • undertake and apply the correct procedures for the handling of specimens, before, during and after analysis • Acquire hands on experience in the use and operation of the different analytical equipment and techniques used in clinical laboratories, for sample analysis • Follow and practice SOPs (Standard Operating Procedures), including trouble shooting procedures				

	• demonstrate a knowledge and application of health and safety requirements • Develop their skills in the execution of clinical laboratory test/analysis • Become familiar with common medical terms **and acquire communication skills with patients and colleagues** • Understand the integration of the different disciplines, to diagnose disease by using the laboratory investigation of specific kidney diseases as a prime example, at different time points of disease progression • demonstrate professionalism by working in accordance with good professional practice in partnership with other professionals, team members and other service providers • use the laboratory computer/GESY software system in accordance with service requirements .		
Prerequisites	-	Required	-
Course Content	<u>Theory:</u> • Students learn about the principles of Biomedical Sciences and explore concepts of biology and medicine amongst other disciplines to determine and understand several factors that can cause diseases. Learn the characteristics of diseases and key micro-organisms of medical importance. • Students examine the interactions of human body systems as they explore and learn about homeostasis in the body. • Students will learn and establish life style choices in exercise, diet and healthy habits that will promote a healthy heart. • Work with a fictional patient that has a disease such as familial heamaturia and follow their health/symptoms, throughout different scenarios of clinical outcomes <u>Laboratory exercises:</u> • Hands-on training will enable students to learn about the use of the different analytical equipment and methods used in the different disciplines, for the investigation and diagnosis of human disorders • Presentation of cases demonstrating the application of the different disciplines in the diagnosis, monitoring and treatment as well as for students to practise their communication skills More specifically, students must: • be able to perform a range of laboratory tests, apply SOPs, without the need for immediate supervision, and demonstrate knowledge of the scientific basis for tests and the disease processes under investigation • demonstrate awareness of factors affecting sample integrity and risks associated with the sample reagents or procedures. Use the corresponding / appropriate control samples in each analysis and be able to check the validity and accuracy of the results • be able to apply principles of quality control and quality assurance and trouble shooting • demonstrate skills in troubleshooting and resolving typical problems in the clinical laboratory and be familiar laboratory safety, laboratory regulations, information systems and management		

	• Conduct verifications and re-analysis to ensure accuracy of results • Communicate results effectively both to patients and to their colleagues <u>Student allocation to stakeholders:</u> The total period of hosting will be 12-13 days, i.e.one full day per week for a whole semester. Students will be allocated by rotation for a minimjum period of two weeks each, so that they are exposed to the four main disciplines (Haematology, Biochemistry, Immunology and Microbiology) which cover routine work in clinical laboratories. The remaining 4 weeks will be for allocation for research. Students who select to spend more time in any one discipline will have the opportunity to do so, since the collaborating stakeholders selected have the ability and experience to accommodate them.
Principles of Biomedical Science Teaching	The course's teaching includes lectures which will introduce students to the Biomedical Sciences and comprehend the different methodologies/ procedures applied for sample analysis, in each discipline. This will help students understand the basic terminology used in Biomedical Sciences and comprehend the main diagnostic disciplines used in Clinical laboratories. Lectures will proceed each practical session and will also prepare the students for the weekly visits in the collaborating Clinical Laboratories. Methods such as discussion, questions/answers, and pros/cons, are used to enhance student's participation. PowerPoint and image-rich material and short animations are used to better understand the principles of Biomedical Science. The laboratory exercises are conducted in the Biology and Biochemistry Laboratory using the appropriate laboratory equipment, under the instructor's supervision. Further training on the specilaized equipment, i.e. clinical biochemistry, hematology, immunology, microbiology, molecular virology and immunohistochemistry will be delivered in the collaborating Clinical Laboratories, including a range of techniques like NGS and flow cytometry . For this training students will be hosted one full day per week in the appropriate Clinical laboratories. Appropriate preparation and demonstration by the laboratory supervisor/Director of the Clinical Laboratory precedes each laboratory exercise/session. Assessment of laboratory exercises includes laboratory reports submitted by each student at the end of each lab exercise/session.
Bibliography	<u>Textbooks:</u> • The Biology of disease, Murray P et al, Publ Wiley Blacwell, ISBN9780632054046 • An introduction to Biomedical Science in Professional Clinical Practice, Pitt SJ and Cunningham J, Publ Wiley, ISBN9780470057155 • Biomedical Research, Medicine, and Disease. Edited ByRC Sobti, Aastha Sobti. Edition 1st Edition. First Published 2023 • Introduction to the Biomedical Sciences Laboratory Manual, Ivy Fitzgerald, 2nd edition, 2020 <u>References:</u> A list of recently published articles will be provided for further reading.
Assessment	For student evaluation, the overall grade is determined as follows:

	Course Work 40% • Experimental lab reports 20% • Case reports 20% Final Exam 60% As far as the grade is concerned, it comprises of the evaluation of the laboratory and case reports (40% of the laboratory grade) submitted by the students after every experiment/case report executed in the collaborative clinical laboratories. In their lab reports, students are asked to describe the experimental procedure, to evaluate and analyse their results and to answer specific questions. The following criteria are considered when evaluating laboratory reports: (a) experimental data collection (30%), (b) data analysis (40%), and application of theory to draw conclusions (30%). In their case reports students are expected to describe different disease cases and the appropriate methods and analysis required as well as the appropriate laboratory equipment that should be used for their diagnostic work up. 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