Course Title	**Precision Medicine/Biomarkers**				
Course Code	ABS404				
Course Type	Compulsory				
Level	BSc (Level 1)				
Year / Semester	4rd year/ 8th Semester				
Teacher's Name	Dr Kyriacos Kyriacou, Dr Panagiotis Kouis				
ECTS	6	Lectures / week	3	Laboratories / week	2
Course Objectives	Motivated by the explosion in Molecular Biology and genomic technologies, and the availability of Biology intensive data today's Medical profession is moving closer to the practice of Precision Medicine. The aim will be to help students understand the basic principles and concepts of Precision Medicine defined as "an emerging approach for disease treatment and prevention that takes into account individual variability in genes, environment, and lifestyle for each person." Students will be provided with the essential knowledge and training on important aspects of precision medicine and how this is practiced today, using specific examples. They will learn how precision medicine has impacted and is shaping today's Clinical laboratory practices. Students will also be exposed to the emerging research trends and future promise of Precision medicine technologies.				
Learning Outcomes	By the end of this course students should be able to : Define precision medicine and highlight the differences between this and conventional medicine Describe the different components of precision medicine and explain in detail how each of this is applied giving examples Be aware of the impact of Precision medicine in the care and management of human diseases, including aging Explain how precision medicine is used in the diagnosis , prognosis and management of disease , with the use of examples Understand and explain new and emerging topics like pharmacogenomics, the microbiome and regenerative medicine as well as cutting edge technologies like NGS and their appliocations Explain the use of biomarkers for the diagnosis and prognosis of disease, with the use of examples. Understand the current use of experimental models including cell cultures, 3D spheroids and animal models, for biomarker discovery Appreciate the challenges associated with precision medicine such as safeguarding patients privacy, cost, ethical, issues, dealing with large data and need of electronic health records Be aware of the current research trends and challenges associated with				

	the practice of Precision Medicine.		
Prerequisites	-	Required	-
Course Content	Theory: Introduction to Precision medicine and its principles Critical appraisal of the advantages and disadvantages of Precision medicine in patient care Understanding infrastructure needs, bio-banking, design of new tools for building and sharing large sets of medical data, including use of electronic health records (EHRs) and the subsequent analysis of data uisng Bioinformatics . Appreciating the importance of formulating new partnerships and setting up clinical trials including collections of large data Applications of Precision Medicine in the management of non-infectious diseases; prevention, diagnosis and prognosis Applications of Precision Medicine in the management of infectious diseases; prevention, diagnosis and prognosis Pharmacogenomics and therapeutic approaches Biomarkers for diagnosing and monitoring disease including the use of animal models for biomarker discovery . The potential benefits of research in precision medicine Workshop/Practical session: • Bio-banking procedures and sample preservation • How to organise a clinical trial • Precision Medicine in the laboratory past, present and future • Case studies • Biomarkers in disease diagnosis, prognosis and monitoring (part of this exercise will be hosted in a collaborative lab with animal house facilities).		
Teaching Precision Medicine	The teaching of the course includes lectures to help students understand the theoretical background and laboratory exercises in order to help them comprehend the main principles of precision medicine biomarkers and how they are applied in the laboratory. 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 Precision Medicine.		
Bibliography	Textbooks: 1. ISBN: 978-1-4419-0769-1 Textbook of Personalized Medicine Kewal K. Jain 2. ISBN: 9781498762588 Handbook of Biomarkers and Precision Medicine, Edited by: Claudio Carini , Mark Fidock , Alain van Gool 3. ISBN: 978-0521088602 Biomarkers of Disease: An Evidence-Based Approach 1st Edition by Andrew K. Trull 4. Principles of Precision Medicine: by Bagher Larijani, Hamid Reza Aghaei Meybodi, Negar Sarhangi & Mandana Hasanzad, Chapter First Online: 01 October 2022 References:		

	A list of recent references ,within the last two years will be recommended for additional reading.
Assessment	Course Work 40% • Mid-term Test 20% • Lab reports 20% Final Exam 60% For student evaluation, the overall grade is determined by a written midterm exam (20%), workshop/practical 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 and examines specific modules of the course. Students also have to prepare and present a report for every workshop/practical. The evaluation of the reports comprises of the 20% of the overall grade. In their reports, students are asked to describe the experimental 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