Course Title	**Molecular Pathology of Complex diseases**				
Course Code	ABS411				
Course Type	Program specific Elective				
Level	BSc (Level 1)				
Year / Semester	4th / 7th				
Teacher's Name	Dr. Maria Papasavva				
ECTS	6	Lectures / week	3	Laboratories / week	2
Course Objectives	Pathology is the study of disease and the use of the term Molecular signifies the importance of molecules in particular genes, that play ,have in disease pathogenesis. The category of Complex diseases includes some of the commonest human diseases like cardiovascular disorders, cancer and diabetes. These are multifactorial disorders which arise as a result of interactions between multiple genes with the environment. This course will discuss the principles involved in the development of complex disorders, with emphasis on understanding the underlying molecular mechanisms and disease pathogenesis. Special emphasis will be given on systemic/organ pathology and histopathology as well as the underlying molecular mechanisms, which are implicated in pathogenesis.				
Learning Outcomes	At the completion of the course the students will be able to: • Understand the complexity of multifactorial disorders and the significance of interactions with the environment • Describe, and discuss the interplay between various factors involved in the pathogenesis of complex disorders, including genes • Describe the role of genetics in the etiology, and in the inheritance of complex diseases • Describe and appreciate the tools and technologies used for elucidating disease mechanisms, including use of mouse models • Critically discuss current issues on the molecular basis of complex diseases • Demonstrate competency in presentation and communication skills • Produce reports according to professional scientific standards				
Prerequisites	ABS210	Required	-		
Course Content	Theory: Essential Pathology- Mechanisms of disease Human genome, transcriptome and proteome: implications in understanding human disease Integrative systems Biology Principles of Histopathology/Molecular Pathology Histopathology and Molecular basis of cardiovascular diseases Histopathology and Molecular basis of pulmonary disease Histopathology and Molecular basis of liver disease				

	Histopathology and Molecular basis of diseases of the endocrine system Histopathology and Molecular basis of gynaecologic diseases Histopathology and Molecular basis of skin disorders Molecular investigation of human disease in the Clinical laboratory Pharmacogenomics <u>Laboratory workshops/exercises:</u> Through the use of laboratory workshops students will be taught • The hallmarks of cancer cells using transformed cell cultures samples • Investigation of apoptosis and cell necrosis • Molecular diagnostic methods • Sample preparation for histology • Histopathology of organs and tissues • Detection of prognostic factors using immunohistology • Tissue Microarrays
Teaching	The teaching of the course includes lectures to help students understand the theoretical background and laboratory exercises in order to help them comprehend key aspects of both histopathology and molecular biology and their involvement in disease pathogenesis.. Using cell cultures students will gain hands on experience on the hallmarks of transformed cells. 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 Molecular Pathology. The laboratory exercises are conducted in the Biology and Biochemistry Laboratory using the appropriate laboratory equipment, under the instructor's supervision. Students will visit a histopathology laboratory in order to experience the whole procedure of tissue fixation, embedding and cutting paraffin sections as well as staining and examination in the microscope. Appropriate preparation and demonstration by the laboratory supervisor precedes each laboratory exercise. Assessment of laboratory exercises includes laboratory reports submitted by each student at the end of each lab exercise.
Bibliography	<u>Textbooks:</u> 1. Coleman, W.B and Tsongalis, G.J. 2nd Edition (2017). Molecular Pathology: The Molecular Basis of Human Disease. Amsterdam: Elsevier. 2. A. Al Chalabi and L. Almasy (2009). Genetics of complex human diseases. New York: Cold Spring Harbor Laboratory Press. <u>References</u> A list of recent articles will be provided for further 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%), 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 and examines specific modules of the course. As far as the laboratory grade is concerned, it comprises of the evaluation of the laboratory reports (60% of the laboratory grade) submitted by the students after every experiment and a final laboratory examination (40% of the laboratory grade) which mainly includes short answer questions and problem-solving questions. In their laboratory 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