

Course Title	Cell Biology and Genetics				
Course Code	ABS105				
Course Type	Compulsory				
Level	BSc (Level 1)				
Year / Semester	1 st / 1 st				
Instructor's Name	Dr. Costas Kadis, Dr Panagiotis Kouis				
ECTS	6	Lectures / week	3	Laboratories/week	2
Course Purpose	<p>The aim of this course is to introduce students to the basic concepts and principles of Cell Biology and Genetics in order to familiarize students with the basic cellular and molecular mechanisms of living organisms. The course focuses on understanding concepts such as the chemical composition of the cells, the cell structure and cellular interactions. Additionally, students will gain specific knowledge regarding genetics, the genetic basis of various diseases and heredity.</p>				
Learning Outcomes	<p>By the end of this course, the students would be able to:</p> <ul style="list-style-type: none"> • Describe the basic cell biology principles • Analyse and present the chemical composition of the cell • Present the organelles of the cell • Explain the cytoskeleton and cell movement • Describe the structure and function of DNA and RNA • Elaborate on the genetic basis of various diseases and the impact of Genetics in disease diagnosis, prevention and treatment • Develop the necessary skills for working in groups • Extract conclusions from data 				
Prerequisites	None		Corequisites	None	
Course Content	<p>Theory</p> <ul style="list-style-type: none"> • Introduction to the cell: Types of cells: Eukaryotic and prokaryotic cells. Comparison of different types of cells. Observation of cells under the microscope. • Chemical composition of cells: Biological molecules of the cell. Structure and function of different cell organelles. • Energy production in cells: Mitochondria and cell respiration (oxidative phosphorylation). Chloroplasts and photosynthesis. 				

	<ul style="list-style-type: none"> • Cell membrane - Cytoskeleton: Structure and permeability. Membrane proteins. Intracellular transfer. Cell communication. • Cell cycle: Mitosis and meiosis. Cell death. • The genetic code: DNA structure and function. DNA replication and repair. Transcription (DNA to RNA) and translation (RNA to protein). Chromosomes, genes and regulation of gene expression. Genetic diseases and chromosomal abnormalities. Cancer and oncogenes. Genetic diversity. • DNA technology: DNA analysis. Research in biomedical sciences. Gene therapy. Cloning. Genetic mechanisms <p>Laboratory: Students perform exercises in subjects such as:</p> <p>Bacteria. E.coli cell culture. Microscopy. Observation of different types of cells under the microscope. Prepare animal and plant samples and observe them under the microscope. Exercises for understanding of DNA structure and the processes of DNA replication, transcription and translation. Exercises for understanding heredity of disease. Mitosis and meiosis under the microscope.</p>
Teaching Methodology	<p>Theory</p> <p>The course is delivered to the students by means of lectures, conducted with the help of computer-based presentations. For the better understanding of the cell biological processes, special images and scientific animations are used/ Detailed notes with PowerPoint are used in the lesson. Image-rich material and short animations are used to gain a better understanding of some molecular biology reactions. Case Studies, Discussion, Questions / Answers are also used depending on the content of the lecture. Lecture notes and presentations are available online for use by students in combination with textbooks. Relevant material published in international scientific journals are also used to follow the latest developments related to the subject of the course.</p> <p>Laboratory</p> <p>Before each laboratory experiment/exercise the lab assistant demonstrates procedures and provides students with all relevant information. The evaluation of the laboratory experiments is performed by submitting lab reports, handouts, solving exercises, answering questions related to the material taught.</p>
Bibliography	<p>(a) <u>Textbooks:</u></p> <p>B. Alberts, D. Bray, K. Hopkin, A. Johnson, J. Lewis, M. Raff, K. Roberts, P. Walter. (2022). <i>Molecular Biology of the Cell</i>, 6th Edition. Garland Science, LLC.</p> <p>B. Alberts, D. Bray, K. Hopkin, A. Johnson, J. Lewis, M. Raff, K. Roberts, P.</p>

	<p>Walter. (2021). <i>Βασικές Αρχές Κυπριακής Βιολογίας</i>, 5η έκδοση. Ιατρικές Εκδόσεις Πασχαλίδης. (In Greek)</p> <p>(b) References:</p> <p>Campbell-Reece et al. (2017). <i>Biology</i>, 11th Edition, Pearson, Benjamin, Cummings.</p> <p>W. S. Klug, M. R. Cummings, C. A. Spencer & M. A. Palladino. (2016). <i>Concepts of Genetics</i>. Pearson New International Edition.</p> <p>Jane B. Reece, A. Campbell. (2013) <i>Βιολογία</i>. Πανεπιστημιακές Εκδόσεις Κρήτης. (In Greek)</p> <p>W. S. Klug, M. R. Cummings, C. A. Spencer & M. A. Palladino. (2017). <i>Βασικές Αρχές Γενετικής</i>. Ακαδημαϊκές Εκδόσεις Ι. Μπάσδρα & ΣΙΑ Ο.Ε. (In Greek)</p> <p><i>Through the services of the university library, access is provided to electronic repositories of scientific journals and articles, indicatively ProQuest, Cambridge University Press and Science Direct with thousands of scientific journals in the fields of health sciences.</i></p>
Assessment	<p>For student evaluation, the overall grade is determined by a written midterm exam (20%), a laboratory grade (20%) and a written final exam (60%).</p> <p>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.</p> <p>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%).</p> <p>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.</p> <p>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. The assessment of this course consists of the coursework (midterm exam, laboratory assessment, class participation) and final exam.</p>
Language	Greek / English