Course Title	**TOXICOLOGY**				
Course Code	ABS402				
Course Type	Compulsory				
Level	BSc (Level 1)				
Year / Semester	4th year, 8th semester				
Teacher's Name	Dr. Julia Atta – Politou, Dr. Panagiotis Theodosis-Nompelos				
ECTS	6	Lectures / week	3	Laboratories/week	2
Course Purpose	The aim of this course is to introduce students to the different fields of Toxicology, e.g. Clinical, Experimental, Forensic, Industrial, Occupational, Environmental and Analytical Toxicology and to teach to them the main causes of poisoning, the mechanism of toxic action, the symptoms and the ways of treating intoxicated humans as well as the analytical methods used to detect toxic substances in biological samples and other specimens. Further aims of the course are the understanding of the use of antidotes and their mode of action, as well as the mechanisms of genotoxicity, mutagenesis and teratogenesis caused by toxic agents. The course also aims the detecting methods for various toxic agents in biological samples of humans, the environment, food, beverages, applying proper qualitative and quantitative analytical techniques used in Toxicology. The course offers the knowledge required for assisting authorities and Clinical Laboratories to investigate the cause of death by toxic agents and contribute to clinical cases of hospitalised patients due to acute or chronic intoxications caused by drug overdose or poisons.				
Learning Outcomes	By the end of this course, the students should be able to: • State the various branches of toxicology and their objectives; • Identify the symptoms of poisoning by the commonest toxic agents; • Recognise the molecular and biochemical mechanisms of toxicity from poisons; • Distinguish about sampling and toxicological analysis for the detection of the poison, that caused the toxic action, in biological samples and other specimens (e.g. food); • Distinguish the general and specific antidotes for common poisons and the mechanism of protection; • Analyse the mechanism of the toxic action of the various chemicals, and the ways of treatment; • Analyse dangers evolving from polluted environment and ways of toxic actions;				
Prerequisites	ABS308		Corequisites	None	

Course Content	Theory: • Introduction to Toxicology • Classification of toxic agents • Reasons of poisoning (accidental, suicidal, professional, criminal). • Disposition of toxicants (absorption, distribution, biotransformation, excretion). • Toxicokinetics • Target organ toxicity, symptoms of poisoning in various tissues and organs. • Toxicity testing • Genotoxic agents, teratogenesis, mutagenesis, fetal toxicity • Therapeutic treatment of intoxications • Antidotes and mechanism of their action • Toxic agents (toxic effects caused from: heavy metals, organic solvents and vapors, alcohols, agrochemicals and pesticides, environmental pollutants, drugs, psychotropic agents and street drugs) • Food poisoning • Clinical Toxicology with examples of poisoning cases • Environmental Toxicology (air pollution and ecotoxicology) • Analytical Toxicology (biological sampling, detection of poisons and their metabolites by classical and by instrumental analytical techniques) and its contribution to forensic and clinical cases Laboratory experiments/exercises: As part of the course, laboratory exercises are carried out on the course material for a better deepening and consolidation of the theoretical part. Indicative exercises cover the toxicological interpretation of pharmaceutical compounds including isolation, purification and quantification of some of them. Examples are: 1. Toxicity of organic solvents 2. Alkaloids – Isolation of nicotine and toxicological study 3. Identification of lead and its toxicity 4. *In silico* prediction of toxicity of various compounds
Teaching Methodology	The teaching methodology includes: A) lectures, with power point presentations, for the understanding of the theoretical background of the lesson. The lectures also include case studies with regard to their toxicological analysis as well as the advantages and disadvantages of various analytical methods used. Power Point detailed notes are used, including tutorials and case studies. To enhance student's participation, discussion between them, questions/answers and debates are encouraged. B) laboratory work/experiments for understanding the basic principles of toxicological analysis for the detection of toxic agents in different specimens.

Bibliography	(a) Textbooks: 1. Casarett & Doull·s, Essentials of Toxicology (2nd edition), Greek translation, Authors: Curtis D. Klaassen, John B. Watkins, 2015, Editor: Parisianos A.E. 2. Casarett & Doull·s, Essentials of Toxicology (3rd edition), Curtis D. Klaassen, John B. Watkins, 2015, The McGraw-Hill Companies. 3. Casarett & Doull's Toxicology: The Basic Science of Poisons (9th Edition), Curtis D. Klaassen, 2018, The McGraw-Hill Companies. 4. Lecturer's notes from Power Point class presentations (b) References: 1. A Textbook of Modern Toxicology", E. Hodgson, Wiley, 4th edition, 2010 2. Pharmaceutical Toxicology. G.J. Mulder, L. Dencker, Pharmaceutical Press, 2006
Assessment	Final Examinations 60%; Course work 40% (Midterm exam 20%, Laboratory work/exams 20%). Course evaluation includes the following: (a) a written examination during the semester which includes specific modules of the course and it accounts for 20% of the total grade (b) laboratory reports during the semester, in which students present the collected and analysed experimental data as well as their conclusions, derived from theory and the experimental data. Together with lab written exams on the laboratory work, lab reports account for a total of 20% of the total score (60% of this concerns the laboratory reports and 40% the exam results) (c) a final written examination which includes all modules of the course material and it accounts for 60% of the total grade. Students are prepared for the above written exams over the theoretical and practical background in the classroom and with additional exercises given to them for further practice. For the better comprehension of the subject frequent revisions are performed at regular intervals. Questions of gradual difficulty apply to the evaluation of the mid-term and final examination. There may be multiple choice or right/wrong questions with justification of the answers or issue analysis and problem solving questions may be applied in order to evaluate the knowledge and perception of the student on the subject. For the evaluation of laboratory exercise reports, the following criteria shall be taken into account, with ratios varying according to the laboratory exercise: (a) data collection

	(b) data analysis (c) application of theory to draw conclusions The above criteria and assessment tools, as well as their weight, are communicated to the students, and are formulated in such a way in order to maximize the expected learning outcomes as well as the quality of the course.
Language	Greek and English