Course Title	**Pharmaceutical Analysis I**				
Course Code	PHA303				
Course Type	Compulsory				
Level	BSc (Level 1)				
Year / Semester	3rd (5th Semester)				
Teacher's Name	Dr Charalampos Triantis				
ECTS	6	Lectures / week	3	Laboratories/week	2
Course Purpose	The aim of this course is to demonstrate analytical techniques applied to drug quality control. Standard analytical methods, volumetric analysis, UV / Vis spectrophotometry are also included in the course. Further aims are to teach about the quality of the pharmaceutical product and methods of its determination and assessment. Examples of the application of the above methods in Pharmaceutical Analysis - reference to the respective Pharmacopoeia monographs - comparison with other methods of determining the same active compound are also included. Statistical processing of results, study of the reliability of the applied methods and evaluation of results by various analytical methods are also part of the course's goals.				
Learning Outcomes	By the end of this course, the students should be able to: • Define terms such as: Accuracy and Precision, Repeatability and reproducibility, analytical blank, Calibration, Validation, Limit of detection (LOD), Limit of quantification (LOQ) • Calculate the pH of strong and weak acids and bases • Explain Henderson – Hasselbalch equation, pka, ionisation of drug molecules, buffers, Partition coefficient and measurement of optical rotation • Describe and explain direct acid/base titrations in the aqueous phase, non-aqueous titrations, as well as argentimetric, complexiметric, redox and iodometric titrations. • Describe Ultraviolet and visible spectroscopy • Describe Infrared spectrophotometry • Describe Atomic spectrophotometry and molecular emission spectroscopy • Describe Nuclear magnetic resonance spectroscopy • Describe Mass spectrometry				
Prerequisites	PHA106		Corequisites	None	
Course Content	**Theory:** • Control of the quality of analytical methods				

	• Physical and chemical properties of drug molecules • Titrimetric and chemical analysis methods • Spectroscopic methods (UV-Vis, IR, NMR, MS etc) **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 are: buffer preparation, titrimetric analysis of common drugs and spectroscopic methods in Pharmaceutical analysis.
Teaching Methodology	The teaching methodology includes lectures offering the theoretical background for a better perception of some concepts of Pharmaceutical Analysis. Methods such as discussion, questions/answers, pros/cons and problem solving are used to enhance student's participation. Detailed notes with PowerPoint are used in the lesson. As part of the developing students' skills, laboratory exercises are carried out by the students themselves in the Pharmaceutical Analysis Lab with the proper laboratory equipment and under the supervision of teaching personnel. Appropriate preparation and demonstration by the laboratory personnel precedes each laboratory exercise. Assessment of laboratory exercises is performed by submitting laboratory reports and taking a final lab exam.
Bibliography	(a) Textbooks: • Watson D. Pharmaceutical Analysis. A Textbook for Pharmacy Students and Pharmaceutical Chemists. 3rd Edition. Greek Publisher Parisianos, 2015. • Pedersen-Bjergaard S, Gammelgaard B, Grønhaug Halvorsen T. Introduction to Pharmaceutical Analytical Chemistry. Greek Publisher Parisianos: Zazaris K, Markopoulos A. 2nd edition, 2022. (b) References: • Pharmaceutical Analysis. A Textbook for Pharmacy Students and Pharmaceutical Chemists. David Watson. 5th Edition, 2020 • Pharmaceutical Analysis. Foskolos G, Psarea-Sandri A. Greek Publisher Symmetria, 2008
Assessment	All written exams conclude open questions, multiple choice questions and problem-solving questions Coursework 50% • Midterm written exam 30% • Lab reports and final lab exam 20% • Final written exam 50% The evaluation of the course is performed by: (a) a written mid-term exam during the semester, which includes specific modules of the course and it accounts for 30% of the overall grade,

	(b) the 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 (60% of lab grade) and final lab exam (40% of lab grade) and it accounts for 20% of the overall grade, and (c) a written final exam, which examines all modules of the course, and it accounts for 50% of the overall grade. 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%). Students are prepared for the above written exams by discussion, questions/answers, pros/cons and problem solving, related to the field of Pharmaceutical Analysis, in the class, while additional problems are given to the students for further practice. 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