COURSE ID SHEET

Course No.	5125	NTUA

Semester:	2	Core	X	Elective		Specialization	

Title: **ANALYTICAL CHEMISTRY**

Aim: Ability to exhibit knowledge relevant to the methods of classical chemical analysis. In laboratory scale, the practice aims each student to be familiar with the work in an analytical lab, such as to work with safety, choose the appropriate treatment of the sample, to perform measurements, to collect and statistically treat analytical data and to evaluate the final result.

Content:

Introduction, scope and methods of Analytical Chemistry. Units of concentration.
Sampling and preparation of a sample for chemical analysis: Dissolution with inorganic acids in open and closed vessels, digestion of organic matrices, extraction, paper chromatography.
Statistical treatment of Analytical Data: Dixon's Q-test for identification and rejection of outliers, confidence intervals.
Chemical equilibrium: Dissociation constant of weak acids and bases. Solubility product constant. Common-ion effect. Introduction to activity (effective concentration). Acid- Base equilibrium, Acid-Base titrations.
Complexometric titrations. Simplex complexes and chelates. Complexometric titrations using EDTA. Metallochromic indicators. Applications.
Oxidation-Reduction titrations: Introduction, Nernst equation. Standard solutions of oxidants and reductants.
Precipitation Titrations: Introduction, precipitation reactions. Adsorption indicators. Argentometry. Applications.
Gravimetric Analysis. Classification. Stages of gravimetric analysis. Precipitation. Organic reagents in gravimetric analysis. Applications.
Laboratory: Buffer solutions, titration of phosphoric acid, determination of olive oil acidity, determination of total hardness of drinking water, determination of the sum of calcium and magnesium in milk, quantification of hydrogen peroxide in its aqueous solution, quantification of chloride in water samples by Mohr titration, gravimetric analysis of nickel using dimethylglyoxime, application of paper chromatography to separate water soluble pigments. Qualitative analysis of salicylic acid in a pharmaceutical formulation containing acetylsalicylic acid, Quantification of iron in lentils and spinach using colorimetry.

Hours per semester:

LECTURES	**26**	EXERCISES	-	LABORA-TORY	**26**	HOME-WORK	**98**	**TOTAL HOURS: 150**

Student performance /evaluation: Evaluation of laboratory practice (participation, evaluation of results of analysis of unknown solutions, laboratory notepad, reports and written test in the end of the semester). The mark obtained will be the 50% of the final mark. Written examination at the end of the semester. The mark obtained will be the 50% of the final mark.