

Faculty of Medicine**FARM1301 Instrumental analysis**

[30h+105h exercises] 6 credits

Teacher(s): Bernard Tilquin
Language: French
Level: First cycle

Aims

The fast development of chemical analysis go along with a deepening use of the physical properties of the molecules which are the bases of chemistry. A good knowledge of these bases is needed in order to select and master instrumental techniques. The selection and the control of the technique are the primary objectives. The search for systematic errors caused by interferences will lead to the analytical process.

Lab work is essential for a proper understanding of the theoretical course and the approach of other techniques. It allows students to develop their critical mind and to learn the rigor, the exactitude and the precision of the experimental approach. An introduction to good laboratory practices is also necessary

Main themes

The main part of the course deals with the methods used in quantitative chemical analysis. The various chapters treat of analytical separation including electrophoresis, chromatography, electrochemistry, spectrophotometry and titration in non aqueous solvents.

Several techniques are briefly explained to allow the selection of the analytical way (Rx, thermo,#).

Many problems (personal work) introduce gradually to the rigor of the quantitative reasoning (problems with complete correction or final result). Exercises taking place during seminars are devoted essentially to the processing of experimental data. During lab work, titration in non-aqueous solvents, potentiometry, electrochemistry, spectrometry are carried out individually and work in small group is proposed For separation methods. The experiments are followed by a report with scientific comments

Content and teaching methods

The diversity of the techniques introduced at the course leads to a confusion which can only be avoided by practice.

The integration of the theoretical course and the lab work is needed in order to illustrate the course, to clearly explain the potentialities of the different techniques and to seek different methods to achieve the quantification. At the laboratory, the experiments introduced by the theoretical course are followed by a personal synthesis. Questions and problems lead to personal reflection. Informatics are essential to lab work and allow students the personal revision of reasoning, the virtual duplication of experiments, the search for information and facilitate data processing. Consultation of reference books is essential (library).

The latest courses are devoted to the answer to the students' questions (all the course is considered and the various topics are integrated). Personal initiative of the student is required and a part of the course is reserved for discussions following student's remarks.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Background

Baccalaureate program of chemical analysis (global methods), courses of physics and physical chemistry.

Assessment

The level of knowledge reached by the student is assessed by oral examination. Students must take part at the exercises which are evaluated separately from the course.

Stand

Documentation, syllabi, library.

1 assistant teacher and 1 laboratory technician per 40 students.

The number of students (pharmacists plus toxicologists) is very high and personal contacts are very heavy and not taken into account. Students are allowed to meet all the members of the team without any restriction.

Reference books : Quantitative Chemical Analysis, D.C. Harris (Freeman)

Analyse chimique, F. et A. Rouessac (Dunod)