

PHARMACEUTICAL ANALYSIS: PHA 6416

(3 CREDITS)

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The course focuses on novel analytical approaches relevant for the determination of drugs and endogenous substances in biological fluids. Theory of sample preparation, gas and liquid chromatography, including pre- and post- column derivatization, mass spectroscopy, immunological and spectroscopic approaches will be discussed and related to practical aspects.

Course Content:

1. Sample Preparation: Precipitation, solvent extraction, ion pair extraction, solid phase extraction, practical hints in designing extraction systems
2. Chromatographic Separation: Band broadening, peak asymmetry, mathematical description, resolution: mathematical description, factors modulating resolution, strategies for improving resolution Classification according to retention mechanism: Normal phase chromatography. (Properties of stationary and mobile phases employed, proposed retention mechanism, practical hints, reversed phase chromatography) (Proposed retention mechanism, characteristics of stationary phases, modulation of retention time, selectivity, practical hints), ion exchange (retention mechanism, characteristics of stationar~phases, modulation of retention time, selectivity, practical hints); ion-pair chromatography (types of ion pairs, retention mechanism, modulation of retention time, selectivity); size exclusion (retention mechanism, modulation of retention time, practical hints) chirale stationary phas~s (proposed retention mechanism, stationary phases), gradient HPLC (gradient elution, optimization of gradient systems, practical hints) detector systems (UVNis, fluorescence detection, electrochemical detection)
3. Derivatization Reactions: Derivatization of selected functional groups, alcohols,

carboxylic acids, guanidino groups, amino acids, alkyl halides, mercaptanes, carbonyl compounds

4. Electrophoresis: Separation principles, laemmli polyacrylamide gel electrophoresis, isoelectric focusing, two dimensional electrophoresis, staining procedures, electro blotting, capillary electrophoresis
5. Immunoassays: The cellular basis of immunity, structure of antibodies, preparation of antigenic conjugates, production of polyclonal and monoclonal antibodies, design of radioimmunoassays, synthesis and handling of radiolabels competities, noncompetitive homogeneous and nonhomogeneous enzyme immunoassays

Grades:

Grades will be based on a written exam (75%) and a term paper (25%). An oral presentation of the term paper (20 mm) has to be given in a seminar like fashion.

Textbooks:

Introduction to Modern Liquid Chromatography, L.R. Snyder and J.J. Kirkland, Wiley, New York, 1979

Methods in Molecular Biology VOL 1: Proteins

Analysis of Drugs in Biological Fluids, J. Chamberlain, CRC Press, Boca Raton, 1985