

Additional subjects for the final exam (Pharmacy) (2010/2011)
Biophysics

Microscope techniques

Magnification, resolution, contrast

Errors of imaging: chromatic aberration, spherical aberration, astigmatism, “pillow” and “barrel” types of torsions

Special optical microscopes

Stereo microscope; ultramicroscope; fluorescence microscope; polarization microscope; phase-contrast microscope

Confocal Laser Scanning Microscopy, CLSM

Multi-photon excitation, 4Pi microscopy

Optical tweezers

Atomic Force Microscopy (AFM)

Electron Microscopy

Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM)

Optical spectroscopic techniques

Absorption spectroscopy in the UV and visible region; absorption coefficient; transmittance, absorbance, optical density

Lambert-Beer law, absorption spectrophotometers

Infrared spectroscopy

Molecular vibrations, normal modes

Identification of molecules and chemicals, analytical applications of IR spectroscopy

Fourier transformed infrared (FTIR) spectrophotometer

Luminescence spectroscopy

Kasha's rule, excitation spectrum, fluorescence spectrum, Stokes-shift; phosphorescence spectrum

“steady state” spectrofluorimeter, quantum yield, lifetime of excited state, determination of time-dependant fluorescence parameters

Time-correlated one-photon counting

Radio spectroscopy methods

ESR, (EPR), NMR, (PMR)

Radio wave, resonance, magnetic moment

Zeeman effect

chemical shift (ppm)

Flow cytometry

Hydrodynamic focusing

Forward Angle Light Scatter (FALS), detection of 90° light scattering, detection of fluorescence

Data processing and storage, correlation methods; cell separation

Static and dynamic light scattering measurement

autocorrelation function

Topics from laboratory practices: Measurements on 11-14th weeks.

Problems: 39, 40