

**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 11-14<sup>th</sup> weeks.

**Problems:** 39, 40