

**SUBJECTS FOR THE *THIRD* MIDTERM TEST (Pharmacy) (20010/2011) 2<sup>nd</sup> semester**  
**Biophysics**

**Basic electronic units and circuits**

voltage divider  
RC circuit-elements in DC circuits  
    charging and discharging a serial RC circuit; parallel RC circuit  
AC filter circuits, low pass filter, high pass filter; noise filtering  
LC circuit (oscillating circuit)  
semiconductor electrical elements, diode; FET (Field Effect Transistor)

**Signals, classification of signals, signal processing**

electrical amplifier, feedback; differential mode amplifier  
signal conversion and signal selection; analog-digital (A/D) conversion; pulse selection  
displays, mechanical writer, cathode ray tube (CRT)  
Liquid Crystal Display (LCD)

**Transport phenomena, flow of fluids and gases**

question of incompressibility  
streamlines, laminar flow, turbulent flow, volumetric flow-rate  
methods for measuring the volumetric flow rate:  
    ultrasound methods (Doppler-examination), dilution techniques  
Law of continuity, ideal and real fluids  
Bernoulli's law and some consequences  
Newton's law of friction, newtonian fluids  
temperature dependence of viscosity (gases, fluids)  
fluid flow in a tube, parabolic velocity profile  
Hagen-Poiseuille law and its application to blood-circulation (conditions)  
    connection between Hagen-Poiseuille law's and Ohm's law  
turbulent flow, Reynolds-number  
Stokes' law, mobility

**Diffusion**

Characteristics of molecular motion  
Fick's first law, diffusion coefficient, Stokes-Einstein equation  
generalized equation of continuity  
Meaning of Fick's second law  
Random-walk problem  
Osmotic phenomenon, van t'Hoff law

**Topics from laboratory practices:** Measurements on 1-5<sup>th</sup> weeks.

**Problems:** 41–44, 55, 60–61, 67, 68