

## PHYSICS DEPARTMENT

Syllabus: **Phys 205 (3 cr.)** – Modern Physics for Life Sciences

Textbook: *College Physics* (Serway & Vuille)

### 1. Electricity

Charges. The electrostatic force. Electrostatic potential energy. Potential energy. Potential difference. The electric field. Gauss's law. Capacitance. Membrane potentials. Electric current. Electrical resistance. Ohm's law. Electric power. Kirchhoff's rules. Measurement of current and voltage. Bridge circuits.

### 2. Electromagnetism

Magnetism. Electromagnetism. Effects of magnetic fields. Ampere's law. Electromagnetic induction. Blood flowmeters.

### 3. Applied Electromagnetism

Electric circuits. Capacitance and inductance in DC currents. Effects of electric current in human body. Electric devices. Alternating current. AC circuits. Electronics.

### 4. Relativity

The basis of relativity. Time and length in special relativity. Mass and energy.

### 5. Atoms

Radiation and quanta. Photoelectric effect. Wave particle duality. Compton effect. Quantum mechanics.

Atomic models. The hydrogen atom. Atomic shell structure. Atomic radiations. Medical uses of lasers, x-rays, etc.

Molecular bonds. Molecular spectroscopy. Crystals.

### 6. Nuclei

Nuclear masses. Stability of nuclei. Radioactivity. Nuclear reactions. Fission and fusion. Radioactive dating. Biological effects of radiation. Applications of radioactive isotopes.

Pre-requisite: Phys 103