



FISICA INFORMATICA E STATISTICA MEDICA - channel 4

10 CFU - 1° Semester

Teaching Staff

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Office Hours: Martedì dalle 11.00 alle 13.00 e il giovedì dalle 16.00 alle 18.00; si consiglia comunque di contattare il docente in anticipo per verificare che impegni istituzionali o personali non lo costringano a spostare il ricevimento di un giorno specifico

ALFREDO FERRO - Module INFORMATICA - INF/01 - 3 CFU

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DETAILED COURSE CONTENT

▪ Physics

Physical quantities and their measurement - Physical quantities, units and systems of measurement, dimensional analysis. Measurements and uncertainties. Instrument characteristics of instrument. Analytical and graphical representations. Scalar and vector quantities.

Elements of mechanics and concepts of Biomechanics - Kinematics. Circular and harmonic motion. Momentum. Principles of dynamics. Work. Energy. Power and efficiency. Statics. Elasticity. Physiological statics. Bone fractures.

Basics of fluids and applications in biological systems - Density. Viscosity. Hydrostatic pressure. Fluid statics. Drip. Dynamics of ideal fluids. Bernoulli's theorem. Aneurysm and stenosis. Real liquids. Poiseuille's relation. Hydraulic resistance. Basics of hemodynamics and hemorheology.

Sphygmomanometry.

Temperature measurement and thermoregulation - Temperature and heat. Temperature metrology. Temperature scales. Clinical thermometers. Heat capacity and Specific Heat. Thermal equilibrium. Change of phase and latent heat. Heat transfer mechanisms. Basal metabolic power. Thermoregulation. Hypothermal and hyperthermal phenomena.

Electrical and bioelectrical phenomena - Electrical charges and fields. Capacitors. Electrical current. Ohm's laws. Elementary circuits. Joule effect. RC circuits. Pacemaker and defibrillator.

Waves and radiations - Wave phenomena. Period and frequency. Amplitude and energy. Mechanical waves. Sound. Decibel. Isophonic curves. Phonendoscope. Electromagnetic waves. Electromagnetic spectrum. Eye and vision. Radiation for diagnostics and therapy. X ray imaging. Radioisotopes and nuclear medicine. Radiotherapy. Biological effects of ionizing radiation. Introduction to radiation protection dosimetry.

TEXTBOOK INFORMATION

- **Physics**

Scannicchio D., Fisica Biomedica, EdiSES, 2013

Davidson R.C., Metodi Matematici per un Corso introduttivo di Fisica - EdiSes, 2013

Lecture notes provided during the course
