



FISICA INFORMATICA E STATISTICA MEDICA - channel 3

10 CFU - 1° Semester

Teaching Staff

CRISTINA NATALINA TUVE' - Module Medical Physics - FIS/07 - 4 CFU

Email: cristina.tuve@ct.infn.it

Office: Dipartimento di Fisica e Astronomia, via Santa Sofia 64, Catania, Italy

Phone: 0039 095 3785437

Office Hours: Martedì e Mercoledì alle ore 15. Al fine di ottimizzare il tempo sia per gli studenti che per il docente è preferibile fissare un appuntamento anticipatamente.

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

Email: apulvirenti@dmi.unict.it

Office: Stanza 35, Terzo Blocco Dipartimento di Matematica e Informatica.

Phone: 095-7383087

Office Hours: Martedì' 10-11.

LORENZO LUPO - Module STATISTICA APPLICATA ALLA MEDICINA - MED/01 - 3 CFU

Email: l.lupo@policlinico.unict.it

Office: edificio 6 Policlinico G. Rodolico

Phone: 0953781818- 3293178093

Office Hours: su appuntamento

DETAILED COURSE CONTENT

▪ Medical Physics

Detailed Program Physical quantities and their measurement - Physical quantities, units and systems of measurement, dimensional analysis. Measurements and uncertainties. Characteristics of measuring Instruments. 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. Essential of bone fractures. Basics of fluids and applications in biological systems - Density. Viscosity. Hydrostatic pressure. Fluid statics. Stevin's law. Pascal's principle. Archimede's principle. Drip feed. Transfusion. Blood sample. Drainage. Dynamics of ideal fluids. Bernoulli's theorem. Aneurysm and stenosis. Real liquids. Poiseuille's law. Hydraulic resistance and Reynold's number. 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. Electrical and bioelectrical phenomena - Electrical charges and fields. Capacitors. Electrical current. Ohm's law. Elementary circuits. Joule effect. RC circuits.

Pacemaker and defibrillator. Risks related to the use of electricity. Waves and radiations. – Wave phenomena. Period and frequency. Amplitude and energy. Mechanical waves. Sound. Decibel. Phonendoscope. Ultrasonic waves. 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

▪ **Medical Physics**

1. D. Scannicchio - Fisica Biomedica - EdiSES, Napoli 2013
 2. Davidson R.C., Metodi Matematici per un Corso introduttivo di Fisica - EdiSes, 2013
 3. Appunti forniti dal docente
-