



UNIVERSITÀ  
degli STUDI  
di CATANIA

DEPARTMENT OF GENERAL SURGERY AND MEDICAL-  
SURGICAL SPECIALTIES  
Bachelor's Degree in Cardiocirculatory and Cardiovascular  
Perfusion techniques  
Academic Year 2017/2018 - 1° Year

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# FISICA APPLICATA STATISTICA MEDICA E INFORMATICA

11 CFU - 1° Semester

## Teaching Staff

**PAOLO CASTORINA** - Module APPLIED PHYSICS - FIS/07 - 4 CFU

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## LEARNING OBJECTIVES

### ▪ APPLIED PHYSICS

Understanding of the Physical Principles of biophysics of the Human body and of the biomedical instrumentation

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## DETAILED COURSE CONTENT

### ▪ APPLIED PHYSICS

- 1) Scientific method. Scalar and Vector physical variables.
- 2) Inertia-force- acceleration-momentum-energy- potentials- gravity
- 3) Structure of matter and phase transition, gas, dynamics of fluids
- 4) Temperature- thermal dilatation- heat transmission- thermodynamics principles

5) Wave and oscillations - sound .

6) Light - reflection and refraction- colors - diffraction and interference.

7) Electrostatic - electric field and potential Elettrostatica - electric current - circuits - magnetism and magnetic induction- electromagnetic waves

8) Biomedical instrumentation and applications

#### ▪ **STATISTICA MEDICA**

.Brief introduction to epistemology of knowledge

2. Scientific use

3. Types of measurement scales: nominal, ordinal, interval and ratio scales

4. Representation of data in graphs and tables

5. Central indicators, variability indicators, asymmetry and kurtosis

6. Probability, sum and product principle

7. Probability application

8. Diagnostic tests: sensitivity, specificity, predictive values

9. Relative risk and odds ratio

10. Probabiloity distributions: binomial, Poisson and normal

11. Standardized Gaussian curve

12. Inference: central limit theorem ,sample distribution of the mean and standard error

13. Confidence interval for the mean and variance

14. Hypothesis test: null and alternative hypotheses

15. Significance tests between two groups: Sudent t test for dependent and independent groups

16. Contingency tables and chi square test

17. Brief description of linear correlation and regression

18. Non parametric-tests

19. Scientific paper

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## **TEXTBOOK INFORMATION**

### ▪ **APPLIED PHYSICS**

Hallyday, Resnik,Walker - Fundamental of Physics

## ▪ STATISTICA MEDICA

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Colton T (1991) Statistica Medica. Piccin: Padova.

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Armitage P, Berry G (1996) Statistica Medica - Metodi statistici per la ricerca in medicina.  
McGraw-Hill Libri Italia srl: Milano

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M. R. Costanzo, (2018). "Statistica sperimentale per le professioni sanitarie", Createspace by Amazon

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