Dipartimento di Scienze e Tecnologie

ACADEMIC YEAR 2017/2018

DEGREE in BIOLOGICAL SCIENCES
CLASS of BIOCHEMISTRY

TEACHER: Prof. FRANCESCO PAOLO MANCINI

- Structural and functional organization of the living matter in prokaryotes and eukaryotes.
- The relevance of non covalent bonds in biology.
- Structure, functions, and physical-chemical properties of H_2O.
- The relevance of the acid-base equilibrium in biology and the equation of Henderso-Hasselbalch.
- The solubility in H_2O of the biological macromolecules.
- Amino acids -The peptide bond - The structural organization levels ofproteins.
- Fibrous proteins: keratins, fibroin, collagen, and elastin.
- Structure and function of myoglobin and hemoglobin.
- Basic principles of thermodynamics: entropy, enthalpy, free energy.
- Enzymes: enzimatic kinetics, models of enzyme-substrate interaction, enzymatic specificity, mechanisms of action and regulation, enzymatic inhibition, coenzymes.
- Bioenergetics: ATP and high-energy compounds in energy exchange.
- Metabolism and its functional levels.
- Structure and functions of carbohydrates and glucidic metabolism: glycolysis, fermentations, Cori's cycle, pentose phosphate pathway, biosynthesis and degradation of glycogen, gluconeogenesis, and respective regulatory mechanisms.
- Krebs' cycle, its regulation, and anaplerotic reactions.
- Glyoxylate cycle.
- Oxidative phosphorylation. and electron transport chain.
- Structure and functions of lipids, and lipid metabolism: transport, biosynthesis and oxidation of fatty acids, metabolism of triglycerides. Regulatory mechanisms of the respective pathways.

- Amino acid metabolism: transamination and urea cycle.
- Integration of metabolism.