SSM
Scuola Superiore Meridionale

Admission to the 1st year of the Ordinary Course in Chemical and Biomedical Sciences (1st level) - Prerequisites for the Biology test

- Evolution according to Darwin.
- Classification of living things.
- Eukaryotes and Prokaryotes.
- Structure and function of nucleic acids. Structure and function of proteins. Inheritance and Mendelian laws, sex chromosomes, Hardy Weinberg's law, inheritance of the mitochondrial genome.
- Dogma of molecular biology: replication - transcription - translation control of DNA transcription in prokaryotes (operon).
- Control of DNA transcription in eukaryotes (enhancers), processing of messenger RNA (splicing).
- Protein synthesis.
- Main classes of proteins: enzymes, structural proteins, factors that regulate gene expression structure of chromatin and chromosome crossing over.
- The genetic code.
- Transfer RNA and ribosomal RNA.
- Cell biology:
- Structure and function of eukaryotic cell membranes.
- Structure and function of intracellular organelles: Golgi apparatus, endoplasmic reticulum, lysosomes, their role in protein synthesis and degradation.
- Structure of the nucleus: membrane, euchromatin, heterochromatin, and nucleolus.
- Mitochondria, cellular respiration and ATP production.
- The cytoskeleton: microtubules and associated proteins.
- Cell replication - the cell cycle.
- Genetic engineering and molecular techniques.
- Restriction enzymes.
- Plasmids and insertion of exogenous genes into prokaryotic cells.
- DNA gel electrophoresis.
- Labeling of DNA, RNA, and proteins by means of radioactive tracers.
- DNA sequencing.

Admission to the 1st year of the Undergraduate Course in Chemical and Biomedical Sciences (1st level) - Prerequisites for the Chemistry exam

- States of aggregation of matter.
- Homogeneous and heterogeneous systems.
- Elements and compounds, the chemical formula.
- Chemical reactions.
- Weight relationships in chemical reactions.
- Properties of gases, liquids, and solids.
- Main properties of the solutions.
- Atomic structure.
- Chemical bonds and molecular structures.
- Periodic table of the elements.

- Elements of thermochemistry and chemical kinetics.
- The chemical balance.
- Acid-base reactions, redox reactions.
- Descriptive inorganic chemistry: hydrogen, halogens, oxygen, sulphur, nitrogen, phosphorus, alkali and alkaline-earth metals.
- Carbon chemistry: characteristics of the carbon atom, bonds, chains, functional groups and main classes of compounds.

Admission to the II level Undergraduate Courses in Genomic and Experimental Medicine (GEM) - Prerequisites for the Biology exam

- Elements of Biology and Genetics

Reference text: Sadava, Hillis, Heller, Hacker - Zanichelli

- The essentials of Molecular Biology of the Cell, Alberts, Bruce, Bray, Dennis, Hopkin, Karen - Zanichelli