# Introduction to Chemistry (with Workshop on Basic Chemistry)

## Prof. Margherita Maria Gimelli

***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

The course aims to describe the chemical structure of matter, the structure and function of biological molecules and cellular organisation, with specific reference to the chemical transformations that characterise living beings.

At the end of the course, students will be able to:

– use basic tools for understanding and teaching topics that require knowledge of the scientific method;

– use basic tools for understanding and teaching topics concerning the life sciences;

– set up simple laboratory experiences in primary schools, in order to promote the learning of the scientific method and the bases of experimental work.

***COURSE CONTENT***

– *Introduction to chemistry*

Natural and synthetic compounds. The chemical basis of the origin of life. Composition and properties of matter, homogeneous and heterogeneous systems, units of measurement. The states of matter.

*– Inorganic chemistry*

Atomic theory and structure of the atom. Periodic table of elements. Chemical bond. Molecules and ions. Chemical reactions. The concept of mole and stoichiometry. Solutions. Acids and bases. Oxidations and reductions. Radioactivity.

– *Organic chemistry*

Structure of carbon. Classification and nomenclature of organic compounds.

– *Life molecules*

Carbohydrates, lipids, proteins, and nucleic acids. Outline of molecular biology (central dogma).

*– Cell biology*

The classification of living organisms: Prokaryotic and eukaryotic cells. Structure and function of cell organelles. Outline of energy and metabolism.

– *Workshop*

Special subject and practical work on specific course topics.

***READING LIST***

M. Stefani-N. Taddei. *Chimica e Biochimica*. Zanichelli, Bologna, 2017.

L. Cipolla, II edizione, EDISES.

***TEACHING METHOD***

The course consists of 30 hours of frontal lectures and is supplemented with didactic-workshop activities held by experts and characterised by specific themes and methodologies agreed with the lecturer. Each workshop session will be aimed at the production of a project/artefact assessed by the experts based on parameters shared with the lecturer and on criteria of completeness, consistency, originality, didactic use.

***ASSESSMENT METHOD AND CRITERIA***

The exam is based on an oral interview. The assessment will be supplemented by the mark obtained for an authentic task performed as part of the student's laboratory work. Students will be assessed on their ability to analyse the different aspects of the structure of matter in a coordinated and unified way. Presentation clarity and command of scientific nomenclature terminology represent further assessment criteria.

***NOTES AND PREREQUISITES***

As it is introductory in nature, there are no prerequisites for attending the course.

Further information can be found on the lecturer's webpage at http://docenti.unicatt.it/web/searchByName.do?language=ENG, or on the Faculty notice board.