UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Chimica

2425-4-G8501R046-G8501R073M

Course title

Chemistry

Topics and course structure

The course presents the basic concepts of modern chemistry applied to concrete experiences in relation to the more general themes reported in the 2012 National Indications and chemistry in ecology and environmental education, also in connection with the topics of the other module of the same course .

Objectives

With this teaching, with constant and participatory attendance at lessons and practical experiences connected to the course, we intend to promote the following learning, in terms of:

- Knowledge and understanding
- Ability to relate differentiated knowledge and models.
- Ability to apply knowledge and models

Methodologies

a) Lecture-Based Teaching: 24 hours

Interactive Teaching: 4 hours

b) Type: lectures, use of videos, readings, active teaching methodologies, experiences, suggestions for home experiments, discussion on communicating basic chemistry concepts to primary school students.

c) Number of hours delivered remotely (synchronous, without recording): 8 hours (goal: to reach a larger number of students in the presence of lectures with communications and content of particular interest to all students; can also be delivered in the afternoon-evening to better achieve the goal)

Online and offline teaching materials

Books
Additional material discussed in class
Slides shown in class
Use of websites for further information

Programme and references

Indicatively, the lesson blocks will follow this scheme:

First part (18-20 hours)

- chemistry as a bridge science between the various disciplines
- the macroscopic and microscopic worlds
- measurements and sizes
- the physical transformations of matter
- from chemical transformations to atomic theory; the periodic table of the elements
- the kinetic-molecular theory
- the moles
- the atom: particles and structure
- water chemistry and chemical bonds

Second part (4-6 hours)

- the evolution of chemical thought in history: the great discoveries and the great chemists of the past

Third part (4-6 hours)

- chemistry in the ecological transition to accelerate the energy transition towards complete climate neutrality and sustainable development with respect for resources and people, mitigate the effects of climate change and move to an energy system with lower greenhouse gas emissions and production and more sustainable energy consumption
- green chemistry and use of reagents and solvents that respect humans and the environment

The course is structured in frontal lessons.

Bibliography

1. Giuseppe Valitutti, Patriza Amadio, Marco Falasca, "Chimica. Concetti e modelli. Dalla materia

all'elettrochimica. Terza Edizione, Zanichelli, 2023 (or other text on the basic notions of chemistry at secondary school level; some texts will be indicated in class; during the first lesson any reference university texts will be indicated which are not in any case compulsory).
2. Alessandro Abbotto, "Il genio quotidiano. Raccolta di racconti del quotidiano di grandi scienziati chimici e delle loro scoperte, Edises, 2023.
3. Alessandro Abbotto, Vito Capriati, “La nuova chimica del XXI secolo. Rivoluzione verde e transizione ecologica”, Edizioni Dedalo, 2023.

Other recommended bibliography:
4) Alessandro Abbotto, Idrogeno. “Tutti i colori dell’energia”, Edizioni Dedalo, 2021.
5) Primo Levi, “Il sistema periodico”, edizione per le scuole, a cura di Roberta Mori, Maria Vittoria Barbarulo, Einaudi Scuola, 2022 (ISBN 8828625678)
6) Vincenzo Balzani, Margherita Venturi, “Chimica!”, Scienza Express
7) Sara Moraca, Elisa Palazzi, "Siamo tutti Greta", Edizioni Dedalo, 2022
8) Gianfranco Pacchioni, “W la CO2”, Il Mulino
9) Eleonora Polo, “L’isola che non c’è”, Edizioni Dedalo
10) Laura Cipolla, “I quaderni della didattica. Metodi e strumenti per l’insegnamento e l’apprendimento della chimica”, EDISES.
11) Alessandro Abbotto, "La mobilità elettrica. Storia, tecnologia, futuro", Carocci Editore, 2022.
12) Alessandro Abbotto, "Perchè l'auto elettrica", Scienza Express, 2024.
13) Testo di chimica generale a livello del primo anno di università per corsi di laurea non chimici (a lezione saranno indicati alcuni testi)

Assessment methods

Written and oral
The written test consists of a multiple test (closed-ended questions), aimed at ascertaining knowledge of the subject matter covered in the lessons.
The oral test (if the written test is passed) is optional, chosen by the candidate or at the request of the teacher. The optional oral test will consist of the discussion of any critical issues in the writing and any need to verify and deepen knowledge of the topics covered in class.
Please note that the oral test, which is optional, may also lead to a reduction in the mark reported in the written test or even an insufficiency. If after the oral test the grade is rejected (or in case of insufficiency) it will be necessary to repeat the written test, even if the grade obtained was sufficient.
During the module, optional ongoing written tests will be offered.

Office hours

Always by appointment via email

Programme validity

One academic year

Course tutors and assistants

Sustainable Development Goals

ZERO HUNGER | GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY | CLEAN WATER AND SANITATION | AFFORDABLE AND CLEAN ENERGY | DECENT WORK AND ECONOMIC GROWTH | INDUSTRY, INNOVATION AND INFRASTRUCTURE | SUSTAINABLE CITIES AND COMMUNITIES | RESPONSIBLE CONSUMPTION AND PRODUCTION | CLIMATE ACTION | LIFE BELOW WATER | LIFE ON LAND