





5.00 credits

30.0 h + 22.5 h

Q1

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| Teacher(s) | Filinchuk Yaroslav ; |
| Language : | French |
| Place of the course | Louvain-la-Neuve |
| Main themes | <ul style="list-style-type: none"> - Structure of the atom - Periodic classification of elements - Chemical bonds - Lewis structures, notion of resonance, hybridization and geometry of molecules, isomerism - Crystal. Principles of diffraction. X-rays and neutrons. - Chemical reactions, stoichiometric calculations - Chemical equilibrium, acids and bases - Ionic equilibrium in aqueous solution - Thermochemistry - Chemical kinetics - Oxidation-reduction reactions and electrochemistry |
| Learning outcomes | <p>At the end of this learning unit, the student is able to :</p> <p>Understanding the basics of general chemistry, structure and properties of matter, chemical reactions and importance of chemistry in many areas.</p> <p>a. Contribution of the activity to the program's A.A. framework 1.3 (S, E), 1.4 (S, E), 1.6 (S, E), 4.1 (S), 4.3 (S), 5.1 (S)</p> <p>b. Specific wording for this program A.A. activity</p> <p>1 Upon completion of this unit, the student will be able to :</p> <ul style="list-style-type: none"> - recognize the fundamental concepts of general chemistry - apply chemical theories to solve a simple inorganic chemistry problem and identify relevant and irrelevant data - explain a measurement method in chemistry (volumetric titration, pH-metry, calorimetry,) - carry out a simple chemistry experiment and analyze its results in light of the theoretical reference |
| Evaluation methods | <ul style="list-style-type: none"> - The lab works give you a total of 5 points. These are made by half of the questions at the beginning of the laboratory works and the preparation to the Lab works and by another half by laboratory reports. In case the number of absences (justified or not) becomes significant, the professor has the right to use the article of RGEE allowing the jury to forbid the inscription to the exam. - There is a written exam counting for 15 points. These are basically the exercises applied to the theoretical course. These exercises are of the same style as those made in exercise sessions during the year. Theoretical questions also make a part of the examination. - The mid-term examination provides 1 bonus point to the final examination score. The result of the mid-term examination is transferred to the June and August exam sessions but not to the next academic year. |
| Teaching methods | <p>The course is taught with the use of PowerPoint slides, available at Moodle.</p> <p>Exercises are provided to facilitate the understanding.</p> <p>The course will be illustrated with examples taken from everyday life in the living world and in industry.</p> |
| Content | <p>Fundamental concepts of chemistry.</p> <p>Introduction to the periodic table.</p> <p>Stoichiometry, concentration.</p> <p>The gas laws.</p> <p>Quantum numbers, orbitals.</p> <p>Chemical bonds: ionic, covalent, intermolecular.</p> <p>Molecular geometry, hybridization of orbitals.</p> <p>Chemical equilibrium, predicting the direction of a reaction; equilibrium constant.</p> <p>Chemical reactions in solution, strong and weak electrolytes.</p> <p>Acid-base reactions, pH and concentration of hydronium ions; titration.</p> <p>Solubility and precipitation, the solubility product, the common-ion effect.</p> |

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| | <p>The rate and the mechanism of reactions, influence of catalysts. Energy, heat, thermochemistry; the first law of thermodynamics, enthalpy. Oxidation and reduction, redox equations. Introduction to electrochemistry, electrochemical cells and electrolysis.</p> |
| Bibliography | <p>1. Principes de chimie, une approche moléculaire, Nivaldo Tro, une adaptation de Eveline Clair, Julie Vézina, Pearson Education, 2015 (ISBN 978-2-7613-7248-0). 2. Principes de chimie, Atkins, Jones, Laverman, de Boeck, 4eme édition, 2017.</p> |
| Faculty or entity in charge | SC |

| Programmes containing this learning unit (UE) | | | | |
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| Program title | Acronym | Credits | Prerequisite | Learning outcomes |
| Bachelor in Physics | PHYS1BA | 5 | |  |
| Minor in Physics | MINPHYS | 5 | |  |
| Bachelor in Mathematics | MATH1BA | 5 | |  |
| Minor in Scientific Culture | MINCULTS | 5 | |  |