UCLouvain

lmapr1230

2019

Organic chemistry

In view of the health context linked to the spread of the coronavirus, the methods of organisation and evaluation of the learning units could be adapted in different situations; these possible new methods have been - or will be - communicated by the teachers to the students.

5 credits	45.0 h + 15.0 h	Q2

This learning unit is not being organized during this academic year.

Teacher(s)	Demoustier Sophie ;Elias Benjamin ;Fustin Charles-André (compensates Elias Benjamin) ;Mignon Denis ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	The course is divided in three parts. The first part deals with 'generalities' required for a good understanding of the reactivity in organic chemistry, namely the reasons why organic compounds do or do not react in given conditions. The second part describes the chemical behavior of the main organic compounds, illustrating the relationships between the structure of a given functional group and its reactivity. The lessons will be frequently illustrated with examples from other disciplines such as materials science and life sciences. The third part consists in an introduction to the main separation techniques used in the chemical industry and to the oil refining industry in particular. It addresses the thermodynamics of phase equilibria (liquid-liquid and liquid-vapor) and describes some practical applications of these equilibria, such as liquid-liquid extraction or fractional distillation.
Aims	**Contribution of the course to the program objectives** Regarding the learning outcomes of the program of Bachelor in Engineering Sciences, this course contributes to the development and the acquisition of the following learning outcomes: LO 1.1 : Apply concepts, laws, reasoning to disciplinary reduced problems. **Specific learning outcomes of the course** At the end of the course, the student will be able to: 1 • distinguish the different types of isomers (structure and geometrical isomers and stereoisomers) ; • recognize the different types of reactants (nucleophiles, electrophiles, radicals, acids and bases) ; • describe the electrons migration within an organic molecule (inductive and conjugation effects) as well as during a chemical reaction between two given compounds; • recognize and represent the main functional groups of organic compounds ; • establish relations between molecular and spatial structures of organic molecules and some properties, in particular, their reactivity ; • predict and explain the expected result for the main types of organic reactions, including their mechanism; • explain the utility of the fugacity and activity concepts; • explain how the chemical process industry takes advantage of the various equation of state- or activity coefficients-based models to compute thermodynamic properties of liquid-vapor or liquid-liquid mixtures at equilibrium; • explain the operation principles of a distillation columns for binary mixtures, of a crude oil distillation column or of a liquid-liquid extraction; • explain the main units composing an oil refinery. - - - - *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Evaluation methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** Students are evaluated through a final written examination
Teaching methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** The course is based on lectures and exercises-based learning
Content	**Part 1** 1. Structure, chemical bonds and geometry of organic molecules 2. Isomerism

	3. Reactivity in organic chemistry (energy diagrams, intermediates, types of reactants, electronic effects) **Part 2** 4. Alkanes , alkenes and alkynes 5. Alkyl halides 6. Aromatic compounds 7. Alcohols, thiols, ethers and epoxydes 8. Aldehydes and ketones 9. Carboxylic acids and their derivatives 10. Amines and their derivatives **Part 3** 11. Phase equilibria : real systems with one or several constituents 12. Practical applications of phase equilibria 13. Introduction to the refining industry
Inline resources	http://moodleucl.uclouvain.be/course/view.php?id=8644
Bibliography	• Les slides présentées au cours et les énoncés des exercices sont disponibles sur Moodle. Ouvrages de référence recommandés: • L. Craine, D. Hart, C. Hadad, Chimie Organique 1 et 2, Dunod, 2008 • D. Klein, Organic Chemistry, Wiley, 2011
Faculty or entity in charge	FYKI

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Minor in Engineering Sciences : Applied Chemistry and Physics (only available for reenrolment)	LFYKI100I	5		
Minor in Applied Chemistry and Physics	LFSA131I	5		
Specialization track in applied Chemestry and Physics	LFYKI100P	5		