Universitat de Lleida

DEGREE CURRICULUM

CHEMISTRY

Coordination: VILLORBINA NOGUERA, GEMMA

Academic year 2019-20

Subject's general information

Subject name	CHEMISTRY
Code	100300
Semester	1st Q(SEMESTER) CONTINUED EVALUATION
Typology	

Degree	Course	Character	Modality
Double bachelor's degree: Bachelor's Degree in Veterinary Medicine and Bachelor's Degree in Science and Production	1	COMMON	Attendance-based

Course number of credits (ECTS)	6
Type of activity, credits, and groups	

Activity type	PRALAB		PRAULA	TEORIA
Number of credits	0.7	0.2	2.1	3
Number of groups	8	10	1	1

Coordination	VILLORBINA NOGUERA, GEMMA
Department	CHEMISTRY
Teaching load distribution between lectures and independent student work	60 contact hours 84 hours of student work
Language	Catalan (Organic Chemistry) / Spanish (General Chemistry)
Distribution of credits	2.9 Master lessons 1.4 Problem sessions 1.2 Seminar sessions 0.5 Laboratory sessions

Teaching staff

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
CANELA XANDRI, ANNA	acanelxa@quimica.udl.cat	1,2	
DAVID , CALIN ADRIAN	calinadrian.david@udl.cat	3,2	
GALCERAN NOGUES, JOSE JUAN	galceran@quimica.udl.cat	,8	
GARCÉS GONZÁLEZ, JOSEP LLUÍS	jlgarces@quimica.udl.cat	,8	
MORALEJO VIDAL, MARÍA DE LOS ÁNGELES	mmv@quimica.udl.cat	1,6	
SANS BADIA, ALBERTO	sans@quimica.udl.cat	1,4	
VILLORBINA NOGUERA, GEMMA	gemmav@quimica.udl.cat	3,7	

Subject's extra information

PERSONAL PROTECTIVE EQUIPMENT (PPE) for the practical sessions

It is **MANDATORY** that students have the following personal protective equipment (PPE) in the course of teaching practices.

- Laboratory coat UdL unisex
- Safety glasses
- Chemical / Biological protection gloves

The PPE can be purchased at UdL's ÚDELS store

Center for Cultures and Cross-Border Cooperation - Cappont Campus

Carrer de Jaume II, 67 low

25001 Lleida

http://www.publicacions.udl.cat/

For more information, check the product listings: http://www.doblegrauvetcpa.udl.cat/en/pla-formatiu/equipament.html

For other protection equipment (for example, caps, respiratory masks, etc.), they will depend on the type of practice to be performed. In this case, the responsible professor will inform if the use of these specific PPE is necessary.

Not carrying the PPE described or not complying with the general security regulations detailed below will mean that the student cannot access the laboratories or have to leave the same.

GENERAL SAFETY RULES IN LABORATORY PRACTICES

- Maintain the place of performance of clean and tidy practices. The work table must be free of backpacks, folders, coats ...
- In the laboratory you can not come with shorts or short skirts.
- Bring closed and covered shoes during the performance of the practices.
- Bring long hair always collected
- Keep the cords fit to protect against spills and spills of chemical substances.
- Do not carry wide bracelets, pendants or sleeves that can be trapped by the equipment, assemblies ...
- Avoid wearing contact lenses, since the effect of chemicals is much greater if they are introduced between the contact lens and the cornea.
- Do not eat or drink in the laboratory
- Smoking is prohibited within laboratories
- Wash your hands whenever you have contact with a chemical and before leaving the laboratory.
- Follow the teacher's instructions and consult any questions about security

Learning objectives

3.1. Objectives of knowledge: The student that pass the subject must:

- Understand and know how to apply the basic concepts of chemistry, such as the conservation of matter or energy laws
- Relate the macroscopic properties with the microscopic description
- Understand the concept of solution and the ways of expressing its concentration.
- Use of chemical equilibrium to understand the spontaneity of processes (especially chemicals)
- Application of the chemical equilibrium concept, and the equilibrium constant, to predict the final state of acid-base systems (and pH calculation), complexes and redox
- Distinguish different concepts with correction
- Be able to read and interpret correctly the statement of a problem
- Apply the formulas correctly, with the corresponding units, and interpret the results obtained
- Know the basic organic inorganic nomenclature, recognizing the functional groups and the main associated properties
- Relate the chemical knowledge acquired with the knowledge of mathematics, physics and biology that they have received or received
- Familiarize yourself with elemental chemical laboratory material

3.2. Capacity objectives: The student that pass the subject must be able to:

3.2.1 Capacity for professional performance

- Analyse specific situations and understand and define problems
- Apply knowledge acquired, managing the resources available appropriately
- Numerically data analyses

- Select and manage the available written and on-line information sources related to the professional activity
- Use the existing computer tools to support the development of their professional activity
- Work alone and in teams
- Value the integral training, personal motivation, mobility

3.2.2. Communication capacity

- Understand and express themselves with the right terminology
- Submit information in written form correctly
- Discuss and argue
- Communicate in different languages (Catalan and Spanish)

3.2.3. Technology transfer ability

- Analyse and assess the social and ethical implications of professional activity.
- Have a critical and innovative spirit.
- Recycle in the new technological advances through continuous learning.
- Analyse and evaluate the environmental implications in their professional activity.
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Significant competences

General competences

The Graduate in Animal and Production Science and Veterinary Medicine must:

- Be able to analyse specific situations, define problems, take decisions and implement action plans in the search of solutions
- Apply knowledge acquired to real situations, managing the resources available appropriately
- Interpret studies, reports, data and analyse them numerically
- Know how to select and use the available written and on-line information related to the professional activity
- Use the existing computer tools to support the development of their professional activity (strategic competence of the UdL)
- Be able to work alone and in a multidisciplinary team
- Be able to value integral training, personal motivation and mobility

Specific competences:

The Graduate in Animal and Production Science and Veterinary Medicine must:

- Know the basis of chemical necessary to develop them professional activity
- Work appropriately in a chemical laboratory including safety, handling and disposal of chemical waste and record activity records
- Express yourself correctly with chemical terms
- Familiarize yourself with the use of the main habitual instruments in a chemical laboratory
- Apply the knowledge acquired to the resolution of problems of the professional activity

Subject contents

THEORETICAL CONTENTS:

***QUÍMICA GENERAL*:**

I. INTRODUCTION TO GENERAL CHEMISTRY (8 contact hours)

1. States of matter. Atomic and molecular mass. Molt concept
2. Stoichiometry and chemical reactions
3. Solutions. Concentration expression
4. The gas laws

II. THERMODYNAMIC (4 contact hours)

1. Work, heat and the first law
2. Thermodynamic. Enthalpy standard of reaction. Hess law. Heat capacity
3. Sponteneity and second law. Chemical equilibrium concept

III. ACID-BASE EQUILIBRIUM (8 contact hours)

1. Acid-base concept
2. Acid-base titration. Indicators
3. Monoprotic and polyprotic acid dissociation equilibrium
4. Hydrolysis
5. Buffer solutions. Physiological pH regulation

IV. PRECIPITATION AND COMPLEXATION EQUILIBRIUM (4 contact hours)

1. Solubility constant
2. Complexation
3. Precipitates solubility

V. OXIDATION-REDUCTION EQUILIBRIUM (2 contact hours)

1. Oxidation and reduction concept
2. Balancing redox reaction
3. Examples of electrochemical reactions

***ORGANIC CHEMISTRY*:**

VI. INTRODUCTION TO ORGANIC CHEMISTRY (8 contact hours)

1. Atomic structure
2. Periodic system and periodic properties
3. Chemical bond. Lewis strustures and Valence shell electron pair repulsion theory (VSEPR)
4. Bond polarity and intermolecular forces

VII. ORGANIC MOLECULES (8 contact hours)

1. Formula Types
2. Principal functional groups and their nomenclature
3. Acidity and basicity of organic compounds
4. Structure and properties relationship

VIII. ISOMERISM AND STEREOCHEMISTRY (6 contact hours)

1. Isomer concept
2. Structural Isomers
3. Organic molecules conformational analysis
4. Stereoisomers. Optical isomers

IX. INTRODUCTION TO ORGANIC CHEMISTRY REACTIONS (4 contact hours)

1. Terminology and basic concepts of Organic chemistry reactivity
2. Oxidation and reduction reactions
3. Substitution reactions

4. Elimination reactions
5. Addition reactions

PRACTICE ACTIVITIES: (All sessions have 2 contact hours)

Laboratory session 1: Preparing standard solutions and titration I. Acid-base titration.

Titration of natrium hydroxide solution. Determination of acetic acid in vinegar.

Laboratory session 2: Preparing standard solutions and titration II. Redox titration.

Titration of Potassium Permanganate against Oxalic Acid

Laboratory session 3: Fatty acid extraction from milk.

Extraction with an organic solvent.

Laboratory session 4: Productions of animal feed flavours

Production by Fischer.

Methodology

Methodology

Master classes.

Problems and questions discussion with small groups.

Laboratory sessions with the aim of knowing the laboratory safety procedures and the techniques useful for the subject.

Computer session with simulation of chemical equilibrium and molecular geometry.

Development plan

Learning activities

Activity type	Description	Contact activity student		Activitat no presencial Alumne		Evaluation	Total time	
		Target	Hours	Student work	Hours	Hours	Hours	ECTS
Master class	Master class (Classroom. Large group)	Explanation of the main concepts	**30**	Study: Gain, understant and synthesize knowledge	**41**	**2**	**73**	**2.9**
Problems and cases	Participative session (Classroom. Large group)	Resolution of problems and cases	**12**	Learn to solve problems and cases	**21**	**2**	**35**	**1.4**
Seminar	Participative session (Small group)	Conducting discussion activities	**10**	Solve problems and cases. To argue	**18**	**1**	**29**	**1.2**
Laboratory	Laboratory session (Small group)	Practice development: understanding phenomena, measuring...	**8**	Write a report	**4**	**1**	**13**	**0.5**
Total			**60**		**84**	**6**	**150**	**6**

Evaluation

Activity type	Evaluation activity		Percentatge grading
	Procedure	**Number**	**(%)**
Master class	Written tests of the theoretical program of the subject	2	**70**
Practice cases	Case studies deliveries or written tests	1	**10**
Seminar	Written or oral tests	1	**10**
Laboratory	Delivery of reports. Written or oral tests	6	**10**
Total			**100**

Bibliography

Basic bibliography:

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- PETRUCCI R.; HARWOOD, W.S. *Química general*, Prentice Hall. Madrid, **1998**.
- WHITTEN, K.W.; DAVIS, R.E.;PECK, M.L. *Química General*. 5a Ed.- McGraw Hill, **1998**.
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- ESTEBAN, S.; NAVARRO, R. *Química general* - UNED. 2 vol., **1985**.
- BRILLAS, E. *Fonaments de la termodinámica electroquímica y cinética* - Barcanova, **1992**.
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