28907 - Chemistry II

Información del Plan Docente

Academic Year	2016/17
Academic center	201 - Escuela Politécnica Superior
Degree	437 - Degree in Rural and Agri-Food Engineering
ECTS	6.0
Course	1
Period	Second semester
Subject Type	Basic Education
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The learning methods and strategies designed for the "Chemistry II" course include lectures (classes regarding the subject theory contents), a teamwork project (this activity involves bibliographic search and group work tutorials), lab sessions and problem-solving classes and seminars.

5.2.Learning activities

1. Lectures (25 h). The lectures are designed to provide the students with basic knowledge about organic chemistry, ion exchange equilibra, soil colloidal systems structure and chemistry, fertilizers and pesticides. The main objetives

of each lesson will be highlighted and an interactive environment will be created for the discussion of theory contents.
2. Problem-solving sessions and seminars (10 h). The goal of this activity is the understanding reinforcement of several subject contents and a better knowledge of critical aspects of the course.
3. Lab sessions (15 h). The goal of this activity is to provide the students with basic skills in chemical laboratory work. The practicals contents involve organic chemistry and agricultural chemistry experiments. The students should self-study the protocols and instructions for planned experiments before going to the lab.
4. Project (10 h). This activity will be carried out in groups. The students will undertake a bibliographic search on a topic beyond the subject contents, elaborate a written report and make an oral exposition. The tutor will give the students regular feedback on progress. The project requires the students to construct logical reasoning to communicate efficiently.

5.3.Program

Theory

TOPIC 1: FORMULATION AND NOMENCLATURE OF ORGANIC CHEMISTY

Saturated and unsaturated hydrocarbons. Halides. Alcohols. Ethers. Amines. Nitriles. Nitrocompounds. Aldehydes. Ketones. Carboxylic acids and their salts. Esters. Anhydrides. Acid halides. Amides.

TOPIC 2: INTRODUCTION TO ORGANIC CHEMISTRY

Carbon and its compounds. Sources of organic compounds. Isolation and identification of organic compounds. Classification of organic compounds. Isomers and stereochemistry.Reactions in organic chemistry.

TOPIC 3: ION EXCHANGE EQUILIBRA

Natural and synthetic materials and the exchange of ions. ion exchange equilibra. Application of ion-exchange resins. Ion exchange in soils.

TOPIC 4: COLLOIDS

Generalizations. Colloidal systems of the soil.

Topic 5: THE PLANT, THE SOIL AND FERTILIZERS

Types of nutrients.

TOPIC 6: NITROGEN

Nitrogen. Nitrogenous fertilzers.

TOPIC 7: PHOSPHOROUS

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Generalizations. Phosphated fertilizers.

TOPIC 8: POTASSIUM

Generalizations. Potassium fertilizers.

TOPIC 9: SECONDARY MACRONUTRIENTS AND MICRONUTRIENTS FERTILIZERS

TOPIC 10: PESTICIDES

Definition. Classification. Historical development. The pesticide industry. Need for theuse of pesticides. Properties of pesticides. Distribution in the soils. Degradation. Toxicity.

Practicals

1. Seminar on organic nomenclature and nomenclature.

2. Identification of functional groups.

3. Determining the content of carbon and organic material of a soil.

4. Determining ammonium nitrate in fertilzers.

5. Saponification: obtaining a soap.

6. Organic synthesis of an attractor.

5.4.Planning and scheduling

	1	2	3	4	5	6	7	8	9	10	11
Learning activities / week											
Class activities											
Lectures	1	2	2	2	2	2	2	2	2		1
Problem-solving and seminars			2			2	2	2	2		
Lab sessions		2		2	2						2

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Project	2				2			2		
Evaluantion										
Non-presential activities										
Self-study	2	4	2	4	2	2	3	2	8	3
teamwork	3		2		2		1			2
TOTAL	8	8	8	8	8	8	8	8	8	8
Learning activities/week	12	13	14	15	16	17	18	19	20	Total
Class activities										65
Lectures	1	1	2	2		1				25
Problem-solving and lectures										10
Lab sessions	2	2	3							15
Project		1		1	2					100
Evaluation							5			5
Non-presential activities										85
Self-study	4	4	3	4	6	7	8			70
Teamwork	1		1	1						15
TOTAL	8	8	9	8	8	8	13			150

5.5.Bibliography and recomended resources

BB	McMurry, John. Química orgánica / John McMurry ; traducción, María Aurora Lanto Arriola, Jorge Hernández Lanto ; revisión técnica, Alfredo Vázquez Martínez...[et al.] . 7ªed. México D.F. : Cengage Learning, cop.2008
BB	Navarro Blaya, Simón. Química agrícola : el suelo y los elementos químicos esenciales para la vida vegetal / Simón Navarro Blaya, Ginés Navarro García Madrid [etc.] : Mundi-Prensa, 2000
BB	Navarro García, Ginés. Fertilizantes : química y acción / Ginés Navarro García, Simón Navarro García . Madrid : Mundi-Prensa, D.L. 2014
BB	Química agrícola. II, Plaguicidas y fitorreguladores / E. Primo Yúfera, J.M. Carrasco Dorrién . - 1ª ed., 2ª reimp. Madrid : Alhambra, 1986
BB	Quiñoá Cabana, Emilio. Nomenclatura y representación de los compuestos orgánicos : una guía de estudio y autoevaluación / Emilio Quiñoá Cabana, Ricardo Riguera Vega . 2ª ed. Madrid [etc.] : McGraw-Hill, D.L. 2005
BC	Bohn, Hinrich L.. Química del suelo / Hinrich L. Bohn, Brian L. McNeal, George A. O'Connor ; versión en español, Mario

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	Sánchez Orozco ; revisión técnica, Rubén Guajardo Viera . 1ª ed. México : Limusa, 1993
BC	Cela, Rafael. Técnicas de separación en química analítica / Rafael Cela , Rosa Antonio Lorenzo, María del Carmen Casais Madrid : Síntesis, 2002
BC	Domènech, Xavier. Química ambiental de sistemas terrestres / Xavier Domènech, José Peral Barcelona [etc.] : Reverté, 2006
BC	Laboratorio de química : Generalidades y aspectos básicos / Carmen Fernández González...[et al.] Cáceres : Universidad de Extremadura. Servicio de Publicaciones, 2009
BC	Tan, Kim H.. Principles of soil chemistry / Kim H. Tan . 3rd ed., rev. and expanded. New York [etc.] : Marcel Dekker, cop. 1998