28956 - Agricultural chemical analysis

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	4
Period	Second semester
Subject Type	Optional
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

Since the subject is theoretical / practical, the proposed methodology includes classroom lectures complemented by sessions of laboratory practices, where the student will apply the basic knowledge about the main tools of chemical analysis applied to agricultural samples . The lectures are reinforced with solving sessions of various types of numerical problems or exercises.
For better monitoring of the learning process they will be presented to the student a series of questionnaires or exercises throughout the semester and will encourage the student to use the tutorial hours.
In support it is posted on the Web (Moodle platform) Basic reference materials as the course syllabus, class presentations of theoretical issues, scripts complementary practices or different material.

28956 - Agricultural chemical analysis

5.2.Learning activities

The program that the student is offered to help you achieve the expected results includes the following activities.

1- Theory classes (20 hours) that consist of lectures aimed at students to acquire theoretical knowledge and basic principles of Chemical Analysis. Classes will be held interactively with students, discussing with them the aspects that are more difficult or especially interesting for each topic. "Case studies" that allow students to consolidate the theoretical concepts and establish the applicability of chemical analysis in solving problems agrifood be presented.

2- Classes problems (10 hours) for determination of chemical species in agrifood matrices (soil, water, plants, fertilizers, food) that will be inserted in the calendar as progress is made in the content of the subject to be seeing in classes theoretical.

3- Laboratory practice (30 h). According to academic calendar 15 sessions of two hours each will be made. various practices on soil nutrient determination, water quality parameters, composition of fertilizers, etc., that promote the consolidation of theoretical knowledge must be developed.

4- Tutorials. Attendance at tutorials to clarify any doubts of more individualized students is recommended. In them, the teacher can do a better closer monitoring of student work orientating with the most appropriate methods.

5.3.Program

Theory Programme

1. Introduction to chemical analysis. Classification of the analytical methods.

2. Stages in chemical analysis.

3. Sampling.

4. Chemical treatment of the samples

5. Calibration methods.

6. Volumetric analysis methods.

7. Instrumental analysis methods. Introduction. Classification.

8. Electro-analytical methods. Conductimetrics and potentiometrics. Applications.

9. Spectroscopic methods.

10. Chromatographic methods. Applications.

11. Soil analysis.

12. Water analysis.

13. Fertilizer analysis.

14. Food analysis.

Practical Programme

1. Water analysis

Determining different parameters related with the water quality: pH, conductivity, alkalinity, chlorides, hardness, sulphates.

2. Soil analysis.

Nutrient measurements: Organic matter, nitrates, Cu.

3. Organic (compost) and inorganic fertilizer analysis.

Measuring phosphates, K, Mg.

4. Food analysis

Measuring: Protein content in cereals, fat in milk, acidity in wine, caffeine in drinks.

5. Analysis of different plant matter.

5.4.Planning and scheduling

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Total
Activity																						63
Theoretical classes	2	2	1	1	2	1	1	1	2		1	1	1	2	1	2						21
Problems	1	1		1		1	1	1			1	1	1	1	1							10
Laboratory classes	2	2	2	2	2	2	2	2	2		2	2	2	2	2	2						28

28956 - Agricultural chemical analysis

																				0
Technical visits																				
Tutorial																				0
Evaluation																			4	4
Independent learning																				87
Individual work	3	4	4	4	4	4	4	4	8	4	4	4	4	4	4	8	8	4		87
Group work																				0
TOTAL	5	8	8	8	8	8	8	8	8	8	8	8	9	8	8	8	8	8		150

5.5.Bibliography and recomended resources

Basic bibliography

- Faithfull, Nigel T.. Métodos [de] análisis químico agrícola : manual práctico / Nigel T. Faithfull ; traducción de Ana Cristina Ferrando Navarro ; revisión de Miguel Ángel Usón Finkenzeller . Zaragoza : Acribia, 2005
- Harris, Daniel C.. Análisis químico cuantitativo / Daniel C. Harris . 3ª ed. Barcelona [etc.] : Reverté, cop. 2007
- Hernández Hernández, Lucas. Introducción al análisis instrumental / Lucas Hernández Hernández y Claudio González Pérez . Barcelona : Ariel, 2002

Recomended bibliography

- Skoog, Douglas A.. Química analítica / Douglas A. Skoog...[et al.] ; traducción María del Carmen Ramírez Medeles ; revisión técnica Luz Beatriz Santos Aquino . 7a. ed. México [etc.] : McGraw-Hill, cop. 2000
- Métodos normalizados : para el análisis de aguas potables y residuales / preparado y publicado conjuntamente por American Public Health Association, American Water Works Association, Water Pollution control Federation ; directora de edición Mary Ann H. Franson . Madrid : Díaz de Santos, D.L. 1992
- Hamilton, Leicester F.. Cálculos de química analítica / Leicester F. Hamilton, Stephen G. Simpson, David W. Ellis ; traducción Luis Rodríguez Terán ; revisión técnica José Luis Morales . 2ª ed. México [etc.] : McGraw-Hill, imp.1990
- Jackson, M.L.. Análisis químico de suelos / M.L. Jackson ; traducido del inglés americano por José Beltrán Martínez . [4a. ed.] Barcelona : Omega, 1982
- Pearson, David. Técnicas de laboratorio para el análisis de alimentos / David Pearson ; traducido del inglés por C. Romero, J. L. Miranda y J. L. Suso . [1a ed.],3a reimpr. Zaragoza : Acribia, D.L. 1997
- Primo Yufera, Eduardo. Química agrícola. I, Suelos y fertilizantes / E. Primo Yúfera, J.M. Carrasco Dorrién . 1a ed., reimpr. Madrid : Alhambra, 1987
- Rubinson, Judith F.. Química analítica contemporánea / Judith F. Rubinson, Kenneth A. Rubinson ; Traducción, Ma Teresa Aguilar Ortega ; Revisión técnica, Josefina de Gyves Marciniack . 1a ed. México [etc.] : Pearson Educación : Prentice Hall Hispanoamericana, 2000
- Rubinson, Kenneth A.. Análisis instrumental / Kenneth A. Rubinson, Judith F. Rubinson . 1a. ed. en español Madrid : Pearson Educación, cop. 2001