

60643 - Process and Product Control

Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	540 - Master's in Industrial Chemistry
ECTS	6.0
Course	1
Period	First semester
Subject Type	Compulsory
Module	---

1. Basic info

1.1. Recommendations to take this course

It is recommended to have passed the subjects of the degree of Chemistry. While they will be held introductions aspects basic and instrumental analytical techniques for all students, especially those who come from other degrees, will expand and deepen the knowledge imparted in the Degree in Chemistry related control industrial processes, automation, sensors and biosensors.

1.2. Activities and key dates for the course

The beginning and end of the course will be marked by the academic calendar of the Faculty of Science, being imparted during the first semester of the academic year. The specific dates on which the various controls and delivery of work throughout the course will place communicate to students in advance. Overall assessment tests will take place on dates determined in the calendar of the faculty of Sciences.

2. Initiation

2.1. Learning outcomes that define the subject

1. Describe and apply analytical methods used in the control of processes and products in the industrial chemical.
2. Correctly use the concepts related to process control and products: automation, analyzers, physical sensors, chemical sensors, biosensors, management, quality, productivity.
3. Select integrated process control systems and products for simple problems and strategies that meet quality and productivity parameters.
4. Appreciate the importance of analytical chemistry and its contribution to the quality control chemical laboratory and productivity

60643 - Process and Product Control

2.2.Introduction

Students who successfully complete this course will acquire extensive knowledge in the field of Industrial Chemistry.

3.Context and competences

3.1.Goals

Students who successfully complete this course will acquire extensive knowledge in the field of industrial chemistry.

Among other topics will study the main techniques used in the chemical industry for controlling processes and chemicals, as well as applications of various advanced methodologies in quality control. Special attention will be given to use of automatic sensors and biosensors in the chemical and biochemical industry analyzers.

3.2.Context and meaning of the subject in the degree

The subject and its expected results respond to the following statements and objectives:

The subject of "Control of processes and products" is a compulsory subject taught within the Master degree in Industrial Chemistry. Its a subject taught by Department of Analytical Chemistry that tries to offer a broadening and deepening of the knowledge imparted in degree in Chemistry related industrial process control.

From this course, students will be ready to select and properly use the methodology work solving real problems involving analytical determinations, characterizations and process control in the industry.

3.3.Competences

- Know and apply advanced methods and detailed procedures and process control products industrial scale.
- Identify, analyze and define the main elements of a problem to solve it with rigor in the environment industrial chemistry.
- Mastering the techniques and management tools for research and development processes, products and services in the chemical and related industry, including management skills and knowledge ability to develop and implement original ideas and to lead projects.
- Knowledge and understanding that provide a basis or opportunity to be original in the development and/or applying ideas, often in a research content.
- That the students can apply their knowledge and ability to solve problems in chemical industry.
- That the students are able to integrate knowledge and face the complexity and formulating judgments based on formation that was incomplete or limited. includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments
- Students can communicate their conclusions and the knowledge and last reasons that support to specialist and

60643 - Process and Product Control

non-specialist in a clear and unambiguous manner.

Manage, discriminate and select sources of bibliographic information.

- Effectively use the information and communications technology as a tool.
- Know and apply concepts related to process control and product. Automation, analyzers, physical sensors, chemical sensors, biosensors, managements, quality and productivity.
- Identify analytical problems in the chemical industry to nominate and elect more analytical techniques suitable for resolution.
- Select integrated process control systems and products for simple problems and strategies that meet quality and productivity parameters.

3.4.Importance of learning outcomes

This course should enable students to acquire all the necessary criteria to decide which should be the design generally an instrumental method or choosing based on the principles of analytical chemistry, with the purpose of obtaining information for controlling processes and products in chemistry, biotechnology industry or another. Through the practices of this course the students will acquire the basic skills for experimental implementation and evaluation of the quality of instrumental analysis methods and their application to sensors and process control industrial.

4.Evaluation

- Written tests contemplating theoretical and/or practical aspects (40%).
- Troubleshooting and case studies (20%).
- Presentation of case studies and conducting scheduled practices. (40%)

5.Activities and resources

5.1.General methodological presentation

The course, entirely attendance, will take place during one semester, and will be developed through teaching classes, lectures, seminars and papers to be presented in class, exercises and laboratory practice, and there will also be visits to industries and laboratories.

5.2.Learning activities

Theoretical program.

During the development of the course different laboratory practices whose contents they will be made related for the theoretical course.

60643 - Process and Product Control

5.3.Program

1. CONTROL OF INDUSTRIAL PROCESSES

Objectives and definitions. Terminology. Sequential and continuous processes. Process automation. Automation and quality. On line sampling. Control devices and systems management. Using instrumental analytical techniques in the process control.

2. AUTOMATION OF THE ANALYTICAL PROCESS

Automated steps: sampling, sample preparation, measurement. Forms and degree of automation. Automation "on line", discontinuous, continuous. Segmented and non-segmented flow. Analyzers "on line" continuous and discontinuous: Control in line: physical, chemical sensors and biosensors. Non invasive monitoring of industrial processes and products.

3. CHEMICAL ANALYZERS

Automation of the analytical method. Analyzer types: continuous and discontinuous: Fundamentals and components. Classification: Process analysers adapted to industrial processes: Systems sequential injection: Automatic systems of particular importance. Water analyzers. Air analyzers. Environmental control networks.

4. SENSORS AND BIOSENSORS

Introduction to process control. Sensors and biosensors. Analytical properties. Physical sensors. Chemical (bio) sensors. Chemical and biochemical receptors. Immobilization of bioreagents. Analytical applications: feed and food industry, chemical industry, Environment, biotechnology.

5. THE ANALYTICAL LABORATORY IN THE INDUSTRY

Information technology in the laboratory. Management systems in the laboratory information (LIMS). Analytical control networks. Automatization and productivity.

6. TRENDS IN ANALYTICAL CHEMISTRY IN INDUSTRY PROCESS CONTROL

Partial resolution of dimensions. Analytical microsystems.

PRACTICAL SESSIONS

60643 - Process and Product Control

During the development of the course different labs whose contents they will be made related for the theoretical course.

5.4.Planning and scheduling

Theoretical class: 30 h.

Solving problems: 10 h.

Lab: 10 h

Presentations of different subjects: 5 h

Study: 85 h

Visits: 5 h

Evaluation: 5 h

5.5.Bibliography and recommended resources