Course Syllabi

1. INDU-00032 ENGINEERING OF REACTIONS III (CATALYSIS)
2. Instructor:
   • Veronica Patricia Pinos Velez
3. Bibliography
   • Catalysis: Concepts and Green Applications, Rothenberg, G., 2017
   • Catalysis: An integrated Textbook for students, Hanefeld, U., y Lefferts, L., 2018
   • Cinética química aplicada, González, J. R. G., González, J., Gonzàlez, M. del P., Gutierrez, J. I., & Gutierrez, M. A., 1999
4. Specific Course Information
   a. A chemical engineer must be able to apply the knowledge acquired in Physics, Mathematics and Chemistry to develop new products, produce them and understand them from science. The engineering of chemical reactors III - Catalysis: studies the reactions that use a catalyst to vary the reaction speed and selectivity towards the desired product. To understand this subject it is necessary to have knowledge of integral and differential calculus, bases in stoichiometry, thermodynamics and transport of fluids, matter and energy, in addition to engineering chemical reactions I and II. This subject contributes with the following achievements of the career: 1. Apply knowledge and skills in mathematics, physics and chemistry, effectively, as basic tools for solving problems in the field of Chemical Engineering. 2. Communicate effectively in oral and written form using the appropriate technical language, either working individually or int teams. 3. To control experiments and processes in the field of chemical engineering, considering transport phenomena, unitary operations, chemical processes, and operational research, in order to obtain relevant information and meet previously defined objectives. 4. To apply the basic foundations of training research, at the exploratory and diagnostic levels, in an appropriate way, for the development of experiments, for the search, selection and evaluation of information, 5. To implement technologies related to the physical and chemical transformation of materials, effectively, incorporating technological improvements or innovations. 6. To act with respect and commitment to the environment, applying management practices and technologies, that allow it to minimize the environmental impact generated by productive activities.
   b. Prerequisites:
      • INGE-00028 Op I filtration-fluidisation
      • INGE-00029 Op I solid handling
      • INGE-00026 Engineering Reactions II
5. Learning Objectives of the Course
   a. Understand and apply the fundamental concepts of Chemical Reaction Engineering III - Catalysis in different applications in industry and in environmental remediation with ethics and respect for the environment. - Know and understand the elements and bases of Catalysis - Know the fundamentals and mechanisms of catalytic reactions - Understand the principles of homogeneous, heterogeneous and enzymatic catalysis - Propose and develop catalytic studies and analyze the results. - Plan a catalysis project
   b. Learning Outcomes
      1. Identify the characteristics of homogeneous catalysis and its applications
      2. Identify the characteristics of homogeneous catalysis and its applications

3. Plants and executes a catalytic study
4. Identify and understand the main types of catalysis and its elements
5. Identify the characteristics of heterogeneous catalysis and its applications
6. Identify the characteristics of heterogeneous catalysis and its applications
7. Identify the characteristics of enzymatic catalysis and its applications
8. Plants and executes a catalytic study
9. Identify the characteristics of homogeneous catalysis and its applications
10. Identify the characteristics of enzymatic catalysis and its applications
11. Identify and understand the main types of catalysis and its elements
12. Identify the characteristics of heterogeneous catalysis and its applications
13. Identify the characteristics of heterogeneous catalysis and its applications
14. Plants and executes a catalytic study
15. Plants and executes a catalytic study
16. Plants and executes a catalytic study
17. Plants and executes a catalytic study

6. Course Topics
    1. Introduction to catalysis
    2. Homogeneous catalysis
    3. Heterogeneous catalysis
    4. Enzymatic catalysis
    5. Design and implementation of a catalytic study