Course Syllabi

1. INGE-00033 TERMODYNAMIC
2. Instructors:
   • Diana Alexandra Criollo Ayala
   • Daniela Alexandra Albuja Arias
3. Bibliography
   • Termodinámica/ Biblioteca Campus Central / estantería 536.7/ código 109996, Kurt C. Rolle, 2006
   • Termodinámica/ Biblioteca Campus Central/ estantería 536.7 / código 111739, Yunes A. Cengel, Michael A. Boles, 2012
   • Termodinámica. Temperatura y calor gases y termodinámica: texto de apoyo para guía del aprendizaje/ Biblioteca Campus Central/ estantería 536.7/ código 123453, Alberto Santiago Avecillas Jara, 2007
4. Specific Course Information
   a. The thermodynamics that can be defined as the science of energy, is an essential part in the integral formation of the chemical engineer. It focuses attention on the teaching of the laws of thermodynamics. The basic principles are explored, with a focus on practical applications and the resolution of a wide variety of problems. Industrial processes demand the application of the Principles of Thermodynamics for the realization of an energy analysis of the different types of systems and the knowledge The study of the thermodynamic properties of the working fluids that circulate through the devices is indispensable to analyze the behavior of the thermal systems, which are integrated into a modern, vital field and in order to determine whether or not a thermodynamic process can occur, as well as the calculation of the maximum performance that can be obtained in the different devices that make up an energy installation. This science is the basis for continuing the study of Introduction to Chemical, Physical-Chemic and Unitary Operations Engineering, thus contributing to the objectives of the numeral discharge profile: 1, 2, 4, 6, 8, 13 and 14.
   b. Prerequisites:
      • CCFF-00036 Physics II
      • CCFF-00039 General chemistry
      • MAES-00094 Comprehensive calculation
5. Learning Objectives of the Course
   a. To provide the necessary foundations to understand the functioning of thermodynamic equipment and processes in industrial plants as well as different chemical phenomena, performing correctly the balances of matter and energy. - To explain the laws of thermodynamics by studying the interactions between matter and the different forms of energy to: -Achieve general knowledge about the macroscopic vision of thermodynamics and its application in industrial processes. - Identify the thermodynamic system. - Define and calculate the thermodynamic properties. - Apply the concept of pure substance and its properties, using different state equations to calculate P, V and T of ideal and non-ideal gases, using steam tables in problem solving. - Use the first law of thermodynamics to perform energy balances. - Understand the concepts of reversibility, irreversibility and entropy. - Use the second law of the term odynamics to perform entropic balances in thermodynamic systems. - Calculate the efficiency of power and cooling cycles. - Understand the application of thermodynamic laws in chemical reactions (thermochemistry)
   b. Learning Outcomes

1. Introduce normal reaction thermodynamic functions
2. Define the concepts of heat and work to introduce the first law of thermodynamics.
3. Introduce the second law of thermodynamics
4. Application of thermodynamic concepts in industrial processes.
5. Present the concept of energy and its nature.
6. Introduce the third law of thermodynamics
7. Identifying the thermodymamic states in the different diagrams
8. Achieve general knowledge about the macroscopic vision of thermodynamics.
9. Identify and safely manage basic laboratory equipment, materials and reagents

6. Course Topics
    1. Basic concepts and definitions:
    2. The first law and other concepts:
    3. Pure fluid volumetric properties:
    4. Thermal effects
    5. The second law of the thermodynamic
    6. Thermochymical
    7. Fluid thermodynamic properties:
    8. 7. combustion reactions