

IC (209)304 Thermodynamics in Industrial Chemistry 3(3/3-0/0)

Abbreviation THERMO IND CHEM

Prerequisite MATH 203 and CHEM 321

This course is opened for MAJOR ELECTIVE COURSE

Course Description

Review of thermodynamics, thermodynamics relations, phase equilibria, chemical reactions and power production.

Objectives

1. Students will be able to understand thermodynamics and its relation to phase equilibria, chemical reactions and power production.
2. Students will be able to calculate designed parameters in operating units from thermodynamics relations, diagrams, and power cycles.

Course Content

Lecture Hours

1. Review of thermodynamics : definitions and laws of thermodynamics	6
2. Thermodynamics relations : Helmholtz equation, Gibbs free energy, mathematics relation, Maxwell relations, change of properties at constant temperature and pressure, and thermodynamics diagrams	6
3. Phase equilibria : equilibrium criteria, phase rule, mixtures, low pressure phase equilibrium, high pressure phase equilibrium	9
4. Chemical reactions : isothermal reaction, adiabatic reaction and electrochemical reactions	6
5. Power production	
5.1 Rankine cycle	3
5.2 Brayton cycle	3
5.3 Combined cycle	3
5.4 Fuel cells and batteries	6
5.5 Electric vehicle	3

Total	45
-------	----