

## **CHE-873 Membrane Technology**

**Credit Hours: 3**

**Pre-requisites: Nil**

### **Course Objectives**

- Introduction to membrane science and technology in all engineering approaches for the transport of substances between two fractions with the help of permeable membranes.
- To acquaint mechanical separation processes for separating gaseous or liquid streams use membrane technology.

### **Course Contents**

- Introduction: Historical developments of membranes & Membrane types
- Membrane processes, Membrane transport theory & Solution-diffusion model
- Structure-permeability relation & Isotropic and an-isotropic membranes
- Metal membranes, Ceramic membranes & Liquid membranes
- Membrane modules, Concentration polarization & Crossflow
- Co-current and counter-current flows & Reverse Osmosis membranes
- Ultrafiltration and Microfiltration membranes
- Evaporation and Gas separation membranes
- Application and process design & Medical applications of membranes
- Membrane reactors, Membrane contactors & Membrane distillation
- Details of lab work, workshops practice (if applicable)

### **Course Outcomes**

- This course would make students familiar with the transport mechanism in:
  - Membrane
  - Membrane materials
  - Membrane preparation and diverse application of membranes in a variety of separation processes.

### **Recommended Reading (including Textbooks and Reference books)**

- Membrane Technology and Applications by R.W. Baker
- Numerical Methods for Chemical Engineers By K.J. Beers
- Handbook of membrane separation by Pabby, Rizvi, Sastre
- Handbook of membrane separation By A. Constantis, N. Moustafui