



**THE OHIO STATE UNIVERSITY**  
COLLEGE OF ENGINEERING

# Responsive Soft Matter in Chemical Engineering

## CBE 5745

### Credit Hours:

3.00

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### Course Levels:

Undergraduate (1000-5000 level)

Graduate (5000-8000 level)

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### Course Description:

This course will first introduce the fundamental intermolecular and surface forces and thermodynamics, and then discuss their roles in determining the properties of simple systems such as gases, liquids, solids and complex soft matter phases and systems. Next, we will discuss representative examples of responsive soft matter, including smart surfaces, liquid crystals and shape changing polymers.

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### Prerequisites and Co-requisites:

3508, or CHEM 4300, or equivalent; or Grad Standing in Engineering, Chemistry, or Physics

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### Course Goals / Objectives:

- Understand basic intermolecular and surface forces with the goal of trying to understand the stimuli-responsive behaviors underlying responsive materials.
  - Able to use intermolecular interaction and thermodynamics analysis to evaluate the equilibrium states of soft matter
  - Become aware of typical synthesis and characterization methods of representative responsive soft matter.
  - Understand the structure-property-functionality relationship of responsive soft matter.
  - Understand and evaluate literature involving responsive soft matter.
  - Able to propose design of responsive soft matter with functionalities for specific applications
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### Course Topics:

- Molecular assembly and surfaces
  - Liquid crystals
  - Polymers
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**Designation:**

Elective