Module title: Surface Phenomena

Module Code: 2418605-01

Module Credit: 3

Term: First term 97-98

Lecturer: A. Samimi (Professor of Particle Technology)
a.samimi@eng.usb.ac.ir

Lecturing time: Sunday (18.00-19.30), Tuesday (18.00-19.30)

Assessments: 45% final exam
35% course work reports
20% seminars

References: Physics and Chemistry of Interface
Hans-Jurgen Butt, Karlheinz Graf, Michael Kappl,
Wiley-VCH, © 2006

Handover Papers

Module Objectives: this course is presented to introduce interfacial phenomena between solid, liquid and gas interfaces. It discusses the heterogeneous systems, and describe intermolecular and surface forces in dispersion systems. The module focuses specifically on application of the knowledge of interface phenomena to catalytic heterogeneous surface reactions, stability of colloidal systems, stabilization or de-stabilization, and their application. The module clarifies the phenomena such as; contact angle and wetting, adsorption, and surface modifications. As the solid particle and its interface behaviors with liquid and gas phases are important in practical applications, a part of the module is particularly devoted to characterization of solid particle properties. In this regard, the size reduction and size enlargement are of special issues which are related to subjects such as; surface area increase, and surface energy changes.
Module Subjects: The following titles are the main subjects, which are presented in turn. Each title includes subtitles which will be discussed in detail.

- **1st Week**: Introduction to Surface Phenomena
- **2nd and 3rd weeks**: Liquid Surfaces
- **4th and 5th weeks**: Thermodynamic of Interfaces
- **6th week**: Surface Forces
- **7th and 8th weeks**: Electric Double Layer
- **9th week**: Electro-Kinetic Phenomena
- **10th week**: Contact Angle and Wetting
- **11th week**: Adsorption
- **12th and 13th weeks**: Characterization of Particulate Solid Properties
- **14th week**: Surface Modification
- **15th and 16th week**: Surfactants, Micelle, Emulsions and Foams