Curriculum - Academic Year 2018-19
Characteristics of the Course Units

	Physical and Chemistry of Interfaces
ECTS credits	*4*
Year / Semester	*I /2°*
Specific learning outcomes	*The module is designed for students to understand the fundamental concepts of surfaces and interfaces, physical and chemical processes on the interfaces, experimental methods on surface characterizations and analytical techniques, surfactants, and adsorption isotherms.* *After studying this Unit, students will be able to* *• describe interfacial phenomenon and its significance;* *• define adsorption and classify it into physical and chemical adsorption;* *• explain mechanism of adsorption;* *• explain the factors controlling adsorption from gases and solutions on solids;* *• explain adsorption results on the basis of Freundlich adsorption isotherms;* *• appreciate the role of catalysts in industry;* *• enumerate the nature of colloidal state;* *• describe preparation, properties and purification of colloids;* *• classify emulsions and describe their preparation and properties;* *• describe the phenomenon of gel formation;* *• list the uses of colloids.*
Contents	*Surface Chemistry Theory and Applications focuses on liquid-gas, liquid-liquid, solid-gas, solid-liquid, and solid-solid surfaces. This module offers information on liquid-gas surfaces, including surface tension, measurement of surface tension, rate of capillarity rise, capillary attraction, bubble pressure and pore size, and surface tension and temperature., then ponders on liquid-liquid and solid-gas surfaces. Discussions focus on surface energy of solids, surface roughness and cleanness, adsorption of gases and vapors, adsorption hysteresis, interfacial tension, and interfacial tension in multicomponent systems.* *Surface chemistry deals with phenomena that occur at the surfaces or interfaces. The interface or surface is represented by separating the bulk phases by a hyphen or a slash. For example, the interface between a solid and a gas may be represented by solid-gas or solid/gas. Due to complete miscibility, there is no interface between the gases. The bulk phases that we come across in surface chemistry may be pure compounds or solutions. The interface is normally a few molecules thick but its area depends on the size of the particles of bulk phases. Many important phenomena, noticeable amongst these being corrosion, electrode processes, heterogeneous catalysis, dissolution and crystallisation occur at interfaces. The subject of surface chemistry finds many applications in industry, analytical work and daily life situations.*
Teaching and learning methods	*Face to face,60 hours*
Teaching techniques	*Lectures, 35 hours* *Practical classes, 25 hours*
Assessment methods	*Written and oral.* *A mid-term written test and a final-term written test are foreseen.* *The mid-term written test will be devoted to the assessment of the level*
Assessment criteria	*In the mid-term test students will be expected to be able to:* *-understand the fundamental concepts of surfaces and interfaces* *- understand the physical and chemical processes on the interfaces* *-analyse the mixing-demixing, phase transition, and adsorption processes* *- analyse a certain topic independently and collaboratively in a team*

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Assessment metrics	*Attribution of a final grade*
Criteria of attribution of the final grade	*The final grade will be determined according to the following rules:* - *Mid-term written test: 30%* - *Final term written test: 50%* - *Oral examination (including practical classes assessments): 20%*
Preparatory course units	*N.A.*
Didactic material	*Hans-Jürgen Butt Karlheinz Graf Michael Kappl Physics and Chemistry of Interfaces*