**Course Description Form**

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| 1. Course Name: | | | | | | |
| Surface Chemistry | | | | | | |
| 1. Course Code: | | | | | | |
| **312SC** | | | | | | |
| 1. Semester / Year: | | | | | | |
| Semester | | | | | | |
| 1. Description Preparation Date: | | | | | | |
| 2-2-2025 | | | | | | |
| 1. Available Attendance Forms: | | | | | | |
| Mandatory | | | | | | |
| 1. Number of Credit Hours (Total) / Number of Units (Total) | | | | | | |
| Two hours per week/ | | | | | | |
| 1. Course administrator's name (mention all, if more than one name) | | | | | | |
| Name: Muaathe A Ibraheem  Email: [Muaathe.a@gmail.com](mailto:Muaathe.a@gmail.com); m.a.ibraheem@uodiyala.edu.iq | | | | | | |
| 1. Course Objectives | | | | | | |
| **Course**  **Objectives** | * **This course is designed to help students to understand the different surface phenomena and its**   **fundamental background. The course deals with chemical and**  **physical phenomena that are important within heterogeneous catalysis**  **and understanding the colloidal state** | | | | | | |
| 1. Teaching and Learning Strategies | | | | | | |
| **Strategy** | * Using both summative and formative assessments for better evaluation * of learning. * give clear and detailed instructions. * concentrate on the main terms and concepts. * Boost student engagement with effective questioning techniques. * Asking relevant and thoughtful questions can encourage participation * and enhance classroom discussions. | | | | | | | |
| 1. Course Structure | | | | | | |
| **Week** | **Hours** | **Required Learning Outcomes** | | **Unit or subject name** | **Learning method** | **Evaluation method** | |
| 1  2  3  4  5  6  7.  8.  9.  10  11  12  13  14  15 | 2  2  2  2    2  2  2  2  2  2  2    2  2  2  2 | Understanding Miller indices  Include surface-specific  phenomena  Understanding Young equation and  their relation to wetting and surfactant action is crucial to this course.  Describe the relation between surface stability and surface energy.  Give a brief description of the concept of surface relaxation and reconstruction  Recognize the essential adsorption concept and adsorption isotherm.  Recognize the essential adsorption concept and adsorption isotherm. Understanding kinetic adsorption types  Realizing catalyst fundamentals  and catalysts classification  Extend knowledge catalysis theory,  Give a comprehensive explanation about catalyst deactivation.  Shows the catalysis process  Concept and explain the selectivity of the catalysis process.  Give a brief description related to catalyst preparation methods.  Explain what the colloidal state is.  Demonstrates in detail classification of colloidal state according to different criteria  Extend learning of colloidal state classification.  Understanding the Coagulation or Flocculation, Hardy-Schulze rule    Describe coagulation, including the coagulation system's properties  and the coagulation system's classification.  Learn about the Coagulation or Flocculation of colloidal materials.  Understand the principle of the Hardy-Schulze rule  Explain the Electro-osmosis, Protective Colloids and Gold Number | | Miller Indices,  Surface energy.  Younge equation, wettability, surface instability, relaxation, reconstruction.  Introduction to adsorption, type of adsorption, Surface Area of Adsorption, Adsorption isotherm types  Kinetic of adsorption, Langmuir isotherm, BET isotherm, Determination of Specific Surface Area  Introduction to catalysis,  properties of the catalysts,  catalyst classification,  Heterogeneous catalyst,  Characteristics of effective  catalyst  Catalysis theories,  Deactivation of catalysts  Fouling, poisoning,  Thermal degradation and  Sintering. promoter    Test1  Catalysts process, selectivity of catalysts, preparation of catalysts  Dry catalysts preparation methods, Wet catalysts preparation method  Introduction Colloidal state, Dispersed Phase and Dispersion Medium, general physical properties of colloidal material  Classification of colloidal material, according to physical state, Classification of colloids based on the nature of the interaction between dispersed.  phase and dispersion medium.  Tyndall Effect, mechanical properties of colloidal. Electrical Properties of Colloidal Solutions,  exam  The coagulation principle of  collide state, Coagulation system classification, flocculation of colloidal material and fluctuate factor  Electro-osmosis, Hardy-Schulze rule, Protective Colloids and Gold Number | presentation | Discussion with students, daily oral questions, and exam | |
| 1. Course Evaluation | | | | | | |
| Distributing the score out of 100 according to the tasks assigned to the student, such as daily preparation, daily oral, monthly, or written exams, reports .... etc  70% exam,  30% daily oral | | | | | | |
| 1. Learning and Teaching Resources | | | | | | |
| Required textbooks (curricular books, if any) | | |  | | | |
| Main references (sources) | | | Articles, books and websites | | | |
| Recommended books and references (scientific journals, reports...) | | | Physical Chemistry P.W Atkins 9th ed. page 892.  Introduction to Colloid and Surface Chemistry.  (Elsevier, 1992). doi:10.1016/C2009-0-24070-0.  Birdi, K. S. Surface and Colloid Chemistry.  (CRC Press, 2009). doi:10.1201/b10154. | | | |
| Electronic References, Websites | | | http://www.smartway2study.com/2016/03/salient-features-of-miller-indices-of.html  https://www.slideshare.net/ErPrabhakar1/miller-indices-for-crystallography-planes  https://www.kruss.de/services/education-theory/glossary/youngs-equation/  https://www.emedicalprep.com/study-material/chemistry/surface-chemistry/adsorption/  http://www.chemistrylearning.com/adsorption/#prettyPhoto | | | |