Course specification

University/Academy: Damanhour University

Faculty/Institute: Faculty of Science

Department: Chemistry

1. Course Data:

Course code:	Course title:	Academic year/level:
Chem. 424	**Physical Chemistry 6**	2010-2011 Fourth year – second term
Specialization: **Chemistry/Physics** **Chemistry/Botany** **Chemistry/Zoology** **Chemistry/Microbiology** **Chemistry/Biochemistry**	No. of instructional units: lecture 3 tutorial 1 practical --	

2. course Aim	**This course is designed to give advanced ideas on colloid chemistry, physical chemistry of high polymer, and catalysis and surface chemistry that may be required by chemists in the course of their careers. It also provide practical training for students in laboratory techniques, methods, instrumentation, and data analysis.**
3. Intended learning outcome	
a) Knowledge and understanding	**At the end of this course the students will be able to** **a1. List the colloidal solution and its theory** **a2. Discus the Catalysis on surface of material** **a3. Mention the chemistry of high polymers**
b) Intellectual skills	**At the end of this course the students will be able to** **b1: compare between the different types of colloidal solution** **b2: show the mechanisms of catalysis.** **b3: determine the forms of high polymer.**

c) Professional skills	**At the end of this course students will have the ability to:** **c1- examine for colloid chemistry, physical chemistry of high polymer, and catalysis and surface chemistry.**
d) General skills	**At the end of this course students will able to** **d1: Work in group** **d2: examine -solving skills, relating to qualitative and quantitative information, extending to situations where evaluations have to be made on the basis of limited information.**
4. course content	**Introduction** **- The colloidal state, classification and Structural characteristics** **- Preparation of colloidal systems** **-purification of colloidal systems** **-Kinetic properties. (Brownian motion and translational diffusion** **Sedimentation velocity and sedimentation equilibrium)** **-Osmotic pressure and the Donnan membrane equilibrium. Optical of colloidal systems** **-Electrical properties of colloidal systems..** **The electrokinetic phenomena and the electrokinetic theory.** **-Colloid stability** **-Flocculation concentration. Schulze-Hardy rule,** **-the DLVO theory, systems containing lyophilic materials** **-An introduction to homogeneous catalysis.** **-Specific acid and base catalysis** **-Catalysis by general acid and bases** **-Enzyme catalysis, mechanism of enzymecatalysis and rate equation** **-Inhibition of enzyme catalysis** **-Heterogeneous catalysis** **-Reuirments for industrially useful catalytically chemical reactions, some applications** **-Adsorption and orientation at interface, thermodynamic of adsorption** **The solid-gas interface(physical and chemical adsorption, adsorption isotherms** **-Langmiur treatment of chemical adsorption, BETequation,** **-Kinetics of surface reactions** **- The solid-liquid interface, contact angle and wetting**

	applications **-Chemical structure of monomers.** **-Chemical structure polymers** **-Synthesis of polymers** **-chemical transformations of polymers.** **-Polymer chain flexibility** **-Dissolution and swelling.** **Degree and kinetics of swelling. Determination of molecular size** **Molecular weight and shape in solution. Molecular mass distribution of polymers.** **-Distribution curves.** **-Thermodynamics of polymer solution.**
5. Teaching and learning method	**4.1. Lecture** **4.2. Contact hours** **5.3. Problem-Based Learning** **4.4. Encourage students to use online and library resources**
Taching and learning methods for students with special needs	• **Computer hall to be used in visual labs and simulation experiments.** • **Data show, overhead projector, Molecular models and chemistry computer programs.** **Changing to credit hours system, it is more effective.**
6. Student Assessment	5.1. Mid term exam. 5.2. Problems. 5.3. Assignments. 5.4 Written exam.
Procedures used:	**Assessment Schedule** Week: 16
Schedule:	Assessment 1: Mid term Week: 9 Assessment 2: Final written
a) Weighing of	Mid-Term Examination: -

Assessment:	Final-Term Examination: **150** Oral Examination: **-** Practical Examination: **-** Semester Work: **-** Total: 150
7. List of Textbooks and References:	**Fred W .Billmeyer Text book of of polymer science , ,Jr,2nd edition (1970).** ***Physical chemistry of polymers, David Sobolev and Nicholas Bobrov, 2nd edition (1978).** **-Harry R. Allcock, and Frederick W.Lampe Contemporary polymer chemistry , (1981)** **-Gordon M. Barrow, Physical Chemistry 5th Edition Mc Hill, USA (1988)** **-Richard I. Masel, Chemical Kinetics and catalysis, Published Marcel Dekker, New Yourk (1996)** **- Regmond and Chang, Physical Chemistry and Bilogical science University science books, California (2001).** **General Chemistry, Peter William Atkins and J. A. Beran, W.H. Freeman &Sons Company; 2nd edition (March 1992).**
Course Notes	**Lecture notes of physical chemistry for 4th year students - faculty of science – Damanhour - Alexandria University.**
a) Required Books (Textbooks)	**Michel Fontanille Organic and Physical Chemistry, Of polymers Yves Gnanou,(2008)** **- Robert L. Augustine "Heterogenous catalysis for the synthetic chemist" John willy & sons, USA (2001).** **Robert J. Silby, Robert Albrty, Physical Chemistry, Jon Wiley Sons New Yourk Toronto (2001)**
Recommended Books	
b) Periodicals, web sites,…,etc	www.openlearn.com www.wikkipedia.com http://www.pslc.ws/mactest/glass.htm

	http://www.ndted.org/EducationResources/CommunityCollege/Materials/Introduction/polymers.htm http://www.answers.com/topic/polymer?cat=health http://chem.chem.rochester.edu/~chem421/index.htm

Course Instructor

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Head of Department

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