Course specification

University/Academy: Damanhour University

Faculty/Institute: Science

Department: Chemistry

1. course Data:

Course code: Chem.326	Course title: Physical Chemistry 3	**Academic year/level:** 2009/2010 Third year /2nd term
Specialization: Zoology and chemistry	**No. of instructional units:** lecture 3hr/week Tutorial 1 hrs/week practical -	

2. course Aim	By the end of this course, students should be able to: • **This course is designed to give a basic understanding of the principal ideas in electrochemistry, chemical kinetics and quantum chemistry that may be required by chemists in the course of their careers.**

3. Intended learning outcome

a) Knowledge and understanding	**At the end of this course the students will be able to:** **a1- Identify the different order of reactions,** **a2- lists the different theories of the reaction rate** **a3- List the different types of electrodes and electrochemical cells.** **a4 – write the classical and quantum mechanical treatment of the simple harmonic oscillator.**

b) Intellectual skills	**At the end of this course the students will be able to** **b1: Analyze the kinetic data to predict the mechanism of reaction** **b2: compare between the order and Molecularity.** **b3: Deduce the relation between activity and the EMF (Nernst equation)** **b4: apply Schrodinger equation to describe the motion of a particle in a box and on a ring.**
c) Professional skills	**At the end of this course students will have the ability to:** **c1: examine problems related to the course content.**
d) General skills	D1: IT and web search engines for collecting information. D2: Work effectively in a team, and independently on solving. D3: Exchange ideas, principles and information by oral, written and visual means. D4: Communicate effectively with his lecturer and colleagues.
4. course content	**-Introduction** **-Types of Electrochemical cells** **-Galvanic cells** **-Types of electrodes.** **-Electrochemical cells** **-EMF and cell reactions.** **-Free-energy changes for cell reactions -Standard EMF's and electrode potentials.** **-The concentration and activity dependence of the EMF (Nernst equation)** **Thermodynamic data from EMF measurements**

	- Measurement of EMF - Applications on EMF -Types of batteries
	Introduction, factors that affect reaction rate, and different types of reaction rate
	Rate laws and its experimental determination and derivation of concentration-time relation
	Rate laws and its experimental determination and derivation of concentration-time relation (continued) -Determination of reaction order.
	Complex reactions -Reaction mechanisms
	-Theories of reaction rates -Transition state theory in thermodynamic terms- -Molecular and trimolecular reactions -Chain reaction -Reaction in solution
	Introduction -Classical mechanical treatment of the simple harmonic oscillator
	Classical mechanical treatment of the simple harmonic oscillator (continued)
	-Molecular vibrations -Propagating and standing waves.
	Black body radiation. -Photoelectric effect., De Broglie waves -Schrödinger equation
	-Interpretation of the wave function. -Particle in a box. - Particle on a ring. - The free electron theory for linear and cyclic systems
	Quantum Mechanical treatment of Simple Harmonic Oscillator -Hydrogen like atoms

5. Teaching and learning methods	5.1. Lectures and seminars using data show and board. 5.2. Problem classes and group tutorial. 5.3.Reports and discussion groups **5.4. Encourage students to use online and library resources**
Student Assessment	Problems. Assignments. Written exam.
Procedures used:	----------
Schedule:	Assessment 1: Final written
Weighing of Assessment:	Final-Term Examination: 150
6. List of Textbooks and Reference:	6.1. Course Notes **Lecture notes of physical chemistry for 3rd year students - faculty of science – Damanhour - Alexandria University.** 6.2. Essential Books (Text Books) **- K. J. Laidler, Chemical Kinetics, Mc Grow-hill, Inc., New delhi 1975** **- R. A. Alberty and R. J. Silby, Physical Chemistry, New York, Wiely 1992** **- D. D. Ebbing and M. S. Wrighton, General Chemistry, Houghton Miffin Company, London, 1993** 6.3. Recommended Books **Thomas Engel, Philip Reid , Physical Chemistry Publisher Jun Smith, New York (2006)** **-Margret Robson Wright " An Introduction to aqueous Electrolyte solution " John Wiley &Sons, Ltd (2007)**

	6.4. Periodicals, Web Sites, . . . etc
a) Required Books (Textbooks)	**Thomas Engel, Philip Reid , Physical Chemistry Publisher Jun Smith, New York (2006)** **-Margret Robson Wright " An Introduction to aqueous Electrolyte solution " John Wiley &Sons, Ltd (2007)**
Recommended Books	**----------**
b) Periodicals, web sites,…,etc	**-------www.Elesevier.com---**

Course Instructor:

Dr. Medhat A. Shaker

Date: **20 / 9 / 2009**

Head of Department: Dr. Medhat A. Shaker

Dr. Medhat A. Shaker