Kuwait University
Vice President for Academic Affairs

جامعة الكويت
نائب مدير الجامعة للشئون العلمية

نموذج توصيف مقرر
Course Description Form

Name of College\Faculty : **اسم الكلية:**

Name of Department: **اسم القسم العلمي:**

Course Name	**GENERAL CHEMISTRY II**	**اسم المقرر**
Course No.	**CHEM 102**	
No. of Credits	**3**	**عدد الوحدات**
Theoretical Hours	**3**	**عدد الساعات النظرية**
Practical Hours	**0**	**عدد الساعات المحلية**

Course topics **مواضيع المقرر**
Text book: (Name, Author , Year , Publisher) **عنوان الكتاب : (الاسم ، المؤلف ، سنة الطبع ، دار النشر)**
Chemistry
References: (Name , Author , Year . Publisher) **عنوان المرجع : (الاسم ، المؤلف ، سنة الطبع ، دار النشر)**
Raymond Chang, latest edition, McGraw Hill, NY.

Prerequisites						**متطلبات المقرر**
Grading	**Exams**	**50**	**%**		**الاختبارات**	**آلية رصد المقرر**
	Quizzes	**10**	**%**		**امتحانات قصيرة**	
	H.W.	**0**	**%**		**واجبات**	
	Project (field study)	**0**	**%**		**مشاريع (دراسة ميدانية)**	
	Final	**40**	**%**		**الاختبار النهائي**	
	100 %					

Chapters included:

Course objectives					
No.	**Course Objectives (Learning Outcomes)**	**Example(s) of relevant (Topics and activities)**	**Recommended Level to satisfy the objectives**		
			High	**Medium**	**Low**
1	• understand the basis of the ideal gas laws and how to use these laws. • apply the kinetic-molecular theory. • appreciate the fact that gases usually do not behave as ideal gases.		**X**		
2	• describe the different intermolecular forces which may be present in liquids and solids (ion-dipole attraction, dipole-dipole attraction, hydrogen bonding and induced dipole). • explain some general properties of gases, liquids and solids on the bases of intermolecular forces. • describe the effects of different kinds of intermolecular forces on phase transitions. • identify the different points and		**X**		

	regions of phase diagram, and to use the diagram to evaluate the vapor pressure of a liquid or the relative densities of liquid and solid.				
3	• Epress the concentration of a solution in unit of mass percentage, molarity, molality and mole fraction. • Describe the process of dissolving a solute in a solvent, including the energy change that may occur. • Calculate Henry's law to calculate the solubility of a gas in a solvent and Raoult`s to calculate the mole fraction of a solute or a solvent. • Use colligative properties to determine the molar mass of a solute.		**X**		
4	• Introduce the concept of entropy. • Discuss the second law of thermodynamics. • Relate entropy to the spontaneity of chemical and physical changes. • Understand the connection between enthalpy and entropy changes for a reaction and the Gibbs free energy change. • Describe the relation between the free energy change for a reaction and its equilibrium constant. • Calculate Gibbs free changes for chemical reactions from the standard molar entropies and enthalpies of formation of reactants and products.		**X**		
5	• Explain the concept of reaction rate. • Understand the rate laws and their significance (the rate constant and order of reaction). • Describe and use the relationships between reactant concentration and the first-order and second-order.		**X**		

	• describe the collision theory of reaction rates. • understand the concept of reaction mechanism, elementary steps, molecularity and rate-determining step. • appreciate the relation of activation energy to the rate.				
6	• understand the nature and characteristics of a state under equilibrium. • write the equilibrium constant expression for any chemical reaction *Kc* and *Kp*. • calculate an equilibrium constant and use the equilibrium constant to calculate the concentration of a reactant or product at equilibrium. • apply Le Chatelier`s principle.		**X**		
7	• define an acid and base in the Bronsted-Lowry and Lewis system. • define the pH function and convert between pH and $[H_3O^+]$. • formulate the equilibrium expression for ionization of weak acid or base, and use it to determine the pH and fraction ionized. • describe the composition of a buffer solution and explain how itr work. • calculate the pH at any point in an acid-base titration and describe how an indicator functions in an acid-base titration. • write the equilibrium constant expression (the solubility product constant) for any insoluble salt. • relate the solubilities of sparingly soluble salts in water to their solubility product constant Ksp. • calculate the solubility of a sparingly soluble salt in a solution that contains a given concentration of a common ion.		**X**		

8	• appreciate the meaning of standard electrode potential and its connection to the free energy change. • Use the Nernst equation to calculate the cell potential under nonstandard conditions. • calculate the equilibrium constant for a reaction from the value of E^o. • Describe the difference between electrolysis of an electrolyte and the operation of a galvanic or voltaic cell. • Use the relationship between current, electric charge and time and use the Faraday constant.		**X**		
9	• balance a nuclear reaction equation • predict the stability of different nuclei. • calculate the nuclear binding energy. • estimate the half life time during nuclear radioactivity processes. • identify the outcome of nuclear transmutation. • identify the different uses of isotopes in medicine and in synthetic applications.		**X**		
Fields	**Chemistry**				
Skills					

Coordinator:	**Physical chemistry division**
Signature and stamp :	
Date:	**05 / 11 /2025**