CHEM 242 Syllabus

Course Code	Course Name	Credits	Prerequisite(S)	Classification			
CHEM 242	Quantum Chemistry and Statistical Thermodynamics	3	CHEM 241	Department			
			Math 202	Requirement			
Course Description	The course aims to give to quantum theory; quantum statistical thermodynam	the students the im mechanics of ics.	basic principals in quant simple systems and intro	um chemistry: oduction to			
Class	Classes are held three times per week, each for 50 minutes.						
Scheduling							
Textbook	1- Quantum Chemistry, McQuarrie & Donald, 1997, University Science Books.						
	2- Quantum Mechanics in Chemistry, Melvin W. Hanna, 3rd edition, 1981.						
Course	Dr. Soha M. Albukhari and						
coordinator	Prof. Osman Abdelkarim						

Relationship	1	2	3	4	5	6	
to SOs							
	Х	х		X			

CLOs By the end of this course student will be able to:

CLO1. Describe the historical development of quantum theory. (SO1)

CLO2. Explain the phenomena like photoelectric effect, black body radiation, atomic and molecular spectra, Compton experiment, wave-like behavior of matter, and how this motivates replace classical mechanics by a wave equation of motion for matter (the Schrödinger equation). (SO1)

CLO3. Study the basic concepts and principles of quantum mechanics: four postulates of quantum theory, the Schrödinger equation, the wave function, physical

interpretation, Eigen-values, Eigen-functions, expectation values, and uncertainty. (SO1)

CLO4. Solve the Schrödinger equation for a particle in 1D, 2D, and 3D box; hydrogen atom and hydrogen-like atoms. Also, solve many problems using the given mathematical formulas. (SO2)

CLO5. Derive the Schrödinger equation from the four postulates of quantum theory; and the time-independent Schrödinger equation from the time-dependent Schrödinger equation. (SO2)

CLO6. Work effectively both individually and in groups. (SO4)

Contents

List of Topics	No. of Weeks
Historical development of quantum mechanics:	4
Postulates of quantum mechanics	2
Exact solution of the Schrodinger's Wave Equation	4
Electronic structure of Hydrogen atom	2
Approximation methods	2
Introduction to Computational Chemistry Methods	1