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**Department of Chemistry**

**College of Science**

**University of Salahaddin**

**Subject: Quantum Chemistry**

**Course Book 4th Chemistry Student**

**Lecturer's name: Assist proof Dr. RounakMerzaShariffJaff**

**Academic Year: 2022-2023**

**Course Book**

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| **1. Course name** | **Quantum &Spectro Chemistry** | |
| **2. Lecturer in charge** | **AsistproffDr.RounakMerzaShariffJaff** | |
| **3. Department/ College** | **Chemistry/ Science** | |
| **4. Contact** | **rounak.shariff@su.edu.krd** | |
| **5. Time (in hours) per week** | **3** | |
| **6. Office hours** | **10 hours per week to the student during the week** | |
| **7. Course code** | **6h** | |
| **8. Teacher's academic profile** | **I received my Bachelors B.SC of Science in Chemistry from Salahaddin University, Erbil-Iraq in 1988. From 1983-1988, I worked as a lab instructor at the Department of Chemistry; and also received Master of Science in Analytical Chemistry from Salahaddin University, Erbil-Iraq in 1994. Finally I received PH. D. of Science in PhysicalChemistry from Salahaddin University, Erbil-Iraq in 2008.Finally I upgraded to assist proffers in 2013.** | |
| **9. Keywords** | **Physical Chemistry, Thermodynamics, equilibrium.** | |
| **10. Course overview:**  **This course includes a detailed overview of physical aspect for the Molecular spectroscopy. Description the Pauli exclusion principle. The electronic structure of an atom the arrangement of electrons around a nucleus, and describe the structure of molecules too. Introduction the principles of chemical atomic structure, the study of parameter that affected on the spectra of atoms.** | | |
| **11. Course objective: Learning the student:**   * **Plot the graph depending on specific laws.** * **Compare and discuss practical and theoretical value.** * **Writing report for each experiment**   **By showing how the spectroscopycan describe the internal structure of atoms and what we see about the experimental information is available from the study of the spectra of atoms.** | | |
| **12. Student's obligation**  **exams**  **literature Review**  . | | |
| **13. Forms of teaching**  **Power point text, andwhite board** | | |
| **14. Assessment scheme**   * .**literature Review 25%** * .**Final Exams: There will be three closed book exams given throughout the semester. Each test will be scheduled for 90 minutes, 25%.**   **Final Exam: The Final Exam is Comprehensive in all course outlines** | | |
| **15. Student learning outcome:**  **Description the An understanding of spectroscopy is fundamental and essential to the study ofmaterials science, and an understanding of atomic stucture is fundamental to an understanding of atomic spectra.** | | |
| **16. Course Reading List and References‌:**  ▪ **Physical chemistry, 4th Edition by N. Ira. Levin.**  **Physical Chemistry, 6th Edition. By: ATKINS.**  **Physical Chemistry, 2ed Edition. By: Gilbert W. Castellan.**  **The Chemistry of molecular nature and change, 1st Edition. By: Martin berbeg.**  ▪ **Physical magazine and review from internet.** | | |
| **17. The Topics:** | | **Lecturer's name** |
| 1st-2nd–Week:  Introduction to types of function:  1.1. types of function  1.2Examples.  1.3 Derivative  1.4Examples.  1.5.Integration  1.6.Examples.  3rdWeek:  Vectors and Scalar:  3.1. Introduction  3.2. . Examples.  4th – 5thh Week:  4.1. Matrix.  4.2. types of Matrix  4.3. Examples.  6thWeek:  6.1. . Cartesian coordinate.  6.2. Introduction.  6.3. Examples :  6.4. Spherical coordinate.  6.5. cylindrical coordinate    7th Week:  7.1. complex number,  7.2. Examples.  7.3. Operator  7.4. Laplace  7.5. Operators in classical mechnics  8th Week:  8.1. harbingers of quantum mechanics,  8.2.black body radiation  8.3. Examples.  9th-10thweek  9.1 the photoelectric effect:  9.1. intoduction.  9.2. Examples  11th– 12thweek.  11.1 the linear spectrum  11.2Examples  13th- Week:  The birth and the emergence of quantum theory (Heisenberg) :  13.1.Comopton  13.2 Planks.  13.3. Examples.  13- Schrödinger equation :  .1. Introduction  .2. The Schrödinger & time.  .3. The Schrödinger &wave function.  . Examples.  14th–Week:  14- prostates of Quantum chemistry.  3.2. Introduction.  3.3. Examples :  4.1. Application of Schrödinger equation,  4.2. Examples. | | AsistproffDr.RounakMerzaShariffJaffex:(3hrs)  ex:11`/8/2022 |
| **18. Practical Topics (If there is any)** | |  |
| **If there is any** | | AsistproffDr.RounakMerzaShariffJaffex:(3hrs)  ex:3/12/2022 |
| ***Calculate the following***.  ***Drive the following***  ***Explain the following.*** | | |
| **20. Extra notes: I will try to do my best to cover the course very well**. | | |
| **21. Peer review**  **I will try to do my best to cover the course very well**..‌‌ | | |