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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 mechnics8th 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. Examples11th– 12thweek. 11.1 the linear spectrum 11.2Examples13th- 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**..‌‌  |