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**Department of Chemistry**

**College of Science**

**University of Salahaddin**

**Subject: Basic Inorganic chemistry**

**Course Book – (First Stage)**

**Lecturer's name: Dr Dotsha Jaleel Raheem**

**Academic Year: 2023/2024**

**Course Book**

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| **1. Course name** | **Basic Inorganic Chemistry**  |
| **2. Lecturer in charge** | **Dr Dotsha Jaleel Raheem** |
| **3. Department/ College** | **Chemistry - Science** |
| **4. Contact** | **e-mail:** **dotsha.raheem@su.edu.krd** |
| **5. Time (in hours) per week**  | **Theoretical: 3** |
| **6. Office hours** |  |
| **7. Course code** |  |
| **8. Teacher's academic profile**  | **Background**BSc in Chemistry from College of Science - Salahaddin UniversityMSc in Organic Chemistry –College of Science – Baghdad UniversityPhD in Chemistry-School of Chemistry – Bangor University-UK**Research interests*** Synthesis of heterocyclic organic compounds with possible biological activities
* Plant chemistry (natural product isolation and structural elucidation) and their quantitative analysis.
* Design and optimisation of methods for the separation and analysis
* Ecological aspects of plant chemicals. Interactions resulting from these chemicals with other organisms (plants, insects and microorganisms) in a specific ecological niche.

**Website**[**https://sites.google.com/a/su.edu.krd/dotsha-j-raheem-2017/**](https://sites.google.com/a/su.edu.krd/dotsha-j-raheem-2017/) |
| **9. Keywords** | **Atoms, periodic table, orbitals, quantum numbers** |
| **10. Course overview:****Inorganic chemistry** is the study of the synthesis, reactions, structures and properties of compounds of the elements. This subject is usually taught after students are introduced to organic chemistry, which concerns the synthesis and reactions of compounds of carbon (typically containing C-H bonds). Inorganic chemistry encompasses the compounds - both molecular and extended solids - of everything else in the [periodic table](http://www.webelements.com/), and overlaps with organic chemistry in the area of organometallic chemistry, in which metals are bonded to carbon-containing ligands and molecules. Inorganic chemistry is fundamental to many practical technologies including catalysis and materials (structural, electronic, magnetic,...), energy conversion and storage, and electronics. Inorganic compounds are also found in biological systems where they are essential to life processes. |
| **11. Course objective:**The periodic table of the elements contains 118 elements that are known to date. Consider for a moment the fact that it takes a semester to teach the basics of understanding a single element in Organic Chemistry, and you will realize why it is impossible to cover all the topics important to the modern study of Inorganic Chemistry. However, we will strive in this course to address the most important concepts and applications of Inorganic Chemistry in research and societal applications.  |
| **12. Student's obligation**In order to pass the subject, students must:* Attend all lectures
* Expect pop quizzes and be ready accordingly
* Take at least one mid-term exam throughout the semester in addition to a final exam on the given topics
* Obtain a minimum passing grade of 50%
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| **13. Forms of teaching**Learning resources in this course include white board, lecture notes, PowerPoint presentations and examples from real life phenomena and situations. |
| **14. Assessment scheme**‌ Breakdown of overall assessment and examinationA total of 100 marks are distributed as follows:* A total of 50 marks is calculated based on students’ efforts throughout the course including: exams, quizzes and class attendance and activity. This is distributed over both theoretical and practical parts
* A final examination in topics given throughout the course (accounts for 50 marks)

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| **15. Student learning outcome:**Structure of the atoms and the reason behind their exact placement in the periodic table. Additionally, how periodicity affects properties of atoms including electronegativity, ionization potential and atomic radii. Types of orbitals and their involvement in formation of chemical bonds. Overall, basic concepts of inorganic chemistry will be covered in this semester. This helps students to gain knowledge of fundamental terms and concepts that helps build necessary information to navigate later more advanced levels of their study of chemistry. |
| **16. Course Reading List and References‌:****Textbook:*** Housecroft, Catherine E., and Alan G. Sharpe. *Inorganic chemistry*. Vol. 1. Pearson Education, 2008.
* Atkins, Peter. *Shriver and Atkins' inorganic chemistry*. Oxford University Press, USA, 2010.
* Martin, Dean F. "Concepts and Models of Inorganic Chemistry, (Douglas, Bodie; McDaniel, Darl H.; Alexander, John J.)." (1994): A185.
* MIESSLER, GARY L., and DONALD A. TARR. "Inorganic Chemistrv J." (2000).

**Useful links****Periodic table: For example,**[**http://www.webelements.com/**](http://www.webelements.com/)[**http://pubs.acs.org/cen/80th/elements.html**](http://pubs.acs.org/cen/80th/elements.html) |
| **17. The Topics:** | **Lecturer's name** |
| - Atom and Structure of the atom* -Atomic number and atomic mass
* -Periodic table ,Name and symbols of elements
* - Groups in Periodic table
* - Electronic configurations.
* -Aufbau Rules.
* - Pauli exclusion Principle .
* - Hund' s rule.
* -Isotopes.
* -The picture of atomic orbitals; s , p and d
* -(n+l) rule and order of orbital energies.
* -Nuclear symbols and effective charge ( Z\*).
* - Periodicity characters.
* - Atomic size and ionic radii.
* -Ionization energy , Electron affinity, Electro-

 -negativity ( Pauling ) * - Quantum number and term symbols.
* - Russell-Saunders states.

- Chemical bonding and it's theories. - Octet rule.- Lewis Structure.- Valence Shell Electron Pair Repulsion (VSEPR)- -- Factor affecting actual bond angle.- Atomic Orbitals.- Molecular Orbital Theory.* **-** Diatomic MO. Homogeneous and Heterogeneous molecules.
 | **Lecturer's name****Bayan Attalla Faiq**(3 hrs per week) |
| **18. Practical Topics (If there is any)** |  |
| Not applicable |  |
| **19. Examinations:**A typical exam question may include a combination of the following:* Definitions
* Identifying the products of chemical reactions
* Giving explanations for facts and phenomena
* Outlining reaction mechanisms
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| **20. Extra notes:** |
| **21. Peer review** |