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**Department of Chemistry**

**College of Science**

**University of Salahaddin**

**Subject: Research Methodology**

**Course Book – MSc and PhD**

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

**Academic Year: 2023/2024**

**Course Book**

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| **1. Course name** | **Research Methodology** | |
| **2. Lecturer in charge** | **Dotsha Jaleel Raheem** | |
| **3. Department/ College** |  | |
| **4. Contact** | **e-mail: dotsha.raheem@su.edu.krd**  **Tel: (optional)** | |
| **5. Time (in hours) per week** | **Theory: 3** | |
| **6. Office hours** | **Sunday 11:30 – 02:30** | |
| **7. Course code** |  | |
| **8. Teacher's academic profile** | **Background**  BSc in Chemistry from College of Science - Salahaddin University  MSc in Organic Chemistry –College of Science – Baghdad University  PhD 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. * 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/)  **Researchgate:** [**https://www.researchgate.net/profile/Dotsha\_Raheem**](https://www.researchgate.net/profile/Dotsha_Raheem) | |
| **9. Keywords** | **IR, 1H NMR, 13C NMR, MS** | |
| Advanced Organic Spectroscopy or Advanced Spectroscopy course includes an advanced and detailed explanation for a range of spectroscopic techniques including infrared spectroscopy (IR), nuclear magnetic spectroscopy (NMR) for both 1H and 13C, mass spectrometry (MS). For each technique, the basic theoretical principle and instrumentation is explained followed by more specific explanation of spectra obtained for different classes of compounds and factors affecting each | | |
| **11. Course objective:**  This course aims to:   * Familiarise students with methods available for structural elucidation and analysis of organic compounds * Help them choose the right technique to answer more specific questions in their research | | |
| **12. Student's obligation**   * The student must attend all lectures * The students must fulfil assignments and exercises given throughout the course * Each student must submit a review article on a topic selected by the lecturer and present their final work to their peers * Students must sit a final exam on the given topics | | |
| **13. Forms of teaching**  Forms of teaching utilized in this course include:   * Power point presentations * Practice texts including research articles and review papers * Class discussions and student presentations * Assignments and example spectra sets | | |
| **14. Assessment scheme**  Breakdown of overall assessment and examination  A total of 100 marks are distributed as follows:   * A final examination in topics given (accounts for 50%) * Marking the review article submitted by the student (accounts for 50%: 25% by the lecturer in charge and 25% from an external examiner)   ‌ | | |
| **15. Student learning outcome:**  By the end of this course the student should be:   * Armed with knowledge that enables them to decide on how to tackle organic chemistry structure elucidation problem * Be able to identify a compound based on its spectroscopic data * Be able to combine information obtained from different techniques to successfully prove the identification and complete assignment of a molecular and structural formula of a compound | | |
| **16. Course Reading List and References‌:**  ▪ Key references: | | |
| **17. The Topics:** | | **Lecturer's name** |
| **Topic 1:** IR spectroscopy, basic principle, instrumentation, IR of different classes of compounds  **Topic 2:** NMR spectroscopy, basic principle, instrumentation, IR of different classes of compounds  **Topic 3:** MS spectrometry, basic principle, instrumentation, IR of different classes of compounds  **Topic 4:** | | Dr Dotsha Jaleel Raheem  (3 hrs) |
| **18. Practical Topics (If there is any)** | |  |
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| **19. Examinations:**  **Exam questions can include a combination of the following:**   * **Definitions of terms** * **Explanation and reasons for given statements** * **Gap filling** | | |
| **20. Extra notes:** | | |
| **21. Peer review پێداچوونه‌وه‌ی هاوه‌ڵ**  ‌‌ | | |