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**Department of Pharmacy**

**Institute of Aynda**

**Subject: Instrumental and Analytical Chemistry**

**Course Book 1st Year**

**Lecturer's name Dr. Khozan A. Haji**

**Academic Year: *2018/2019***

**Course Book**

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| **1. Course name** | **Instrumental and Analytical Chemistry** | |
| **2. Lecturer in charge** | **Khozan A. Haji** | |
| **3. Department/ College** | **Pharmacy** | |
| **4. Contact** | **e-mail: khozan\_haji**  **Tel: 009647504775925** | |
| **5. Time (in hours) per week** | **Theory: 2**  **Practical: 2** | |
| **6. Office hours** |  | |
| **7. Course code** |  | |
| **8. Teacher's academic profile** | **I am studying in the field of pharmaceutical instruments and a specialist in the field of physical chemistry. I obtained a bachelor's degree in chemistry in 1997 at the Faculty of Education, Salahaddin University. I received a master's degree in analytical chemistry in 2001 in the same university and in the same department and** I **received PhD in physical chemistry in 2014 in kinetic branch also in the same department.**  **I am studying in different fields in chemistry**   1. **Physical chemistry-kinetics** 2. **Analytical chemistry** 3. **Inorganic chemistry** 4. **Radiation chemistry** 5. **Nuclear chemistry** 6. **Thermodynamics** 7. **Pharmaceutical instruments**   **Teaching science depends on the good and intimate relationship with the students and make room for their questions and what goes on in their minds.** | |
| **9. Keywords** | **Pharmacy, drugs, spectrophotometer, AAS, HPLC** | |
| **10. Course overview:**  Medicinal chemists, pharmacologists, biochemists, analytical chemists and medical professionals have paved the way with their single goal objective to combat the sufferings of human beings. In this integrated effort the role of an analyst the chemical purity of pharmaceutical substances and drugs made therefrom and finally the dosage forms that are usually available for direct patient’s usage, has become not only extremely crucial but also equally important and vital. As on date product safety has to be an integral part of all product research in pharmaceutical substances. However, the risk-beneft-ratio has got to be pegged to a bare minimum level. Therefore, it has become absolutely necessary to lay emphasis on product. safety research and development which is very crucial in all the developmental stages of a new secondary pharmaceutical product. | | |
| **11. Course objective:**  The purpose of this lesson is to understand the nature and properties of the pharmaceutical products and what depends on this attribute.  In the beginning we must know the components of the drugs and the analysis of it.  We also try to find new method for determination the real concentration of the any drug in the pharmaceutical products.  And finally to know the relation and difference between the methods (instrumental methods for determination of pharmaceutical products. | | |
| **12. Student's obligation**  Attendance of the students in the lectures is very important and writing the notes about the lecture during the lecture delivered by the lecturer, so that they benefit from these observations for exams. | | |
| **13. Forms of teaching**  The use of modern techniques in the lecture, such as three-dimensional illustrations. | | |
| **14. Assessment scheme**  We take two exams in the theoretical part in each course. Each exam holds 10 degrees (20%).  In practical part the degrees distributed to the weekly reports, the quizzes, the attendance and one exam all are over 10 (10%).  For final exam theoretical holds 30 degrees (30%).  And practical 30 degrees (30%).‌ | | |
| **15. Student learning outcome:**  Each branch of chemistry has its own importance.  Especially pharmaceutical instruments is a related to study the properties of pharmaceutical products.  We must know that this specialty is linked to human life and health, which is considered the main building block in this universe. | | |
| **16. Course Reading List and References‌:**  1- Douglas A. Skoog, and Donald M. West “Fundamentals of  Analytical  Chemistry”, Publisher: Mary Finch,Ninth Edition, 2014.  2- A. Kar, “pharmaceutical drug analysis”, New Age Int. Pub. | | |
| **17. The Topics:** | | **Lecturer's name** |
| 1st week  Calculations Used in Analytical Chemistry | |  |
| 2nd week  Aqueous Solutions and Chemical Equilibria. | |  |
| 3rd week  Classical Methods of Analysis.  Gravimetric Methods of Analysis | |  |
| 4th week  Titrations in Analytical Chemistry | |  |
| 5th week  Applications of Neutralization Titrations on Pharmaceutical Analysis. | |  |
| 6th week  Introduction to Spectrochemical Methods | |  |
| 7th week  Instruments for Optical Spectrometry. | |  |
| 8th week  ULTRAVIOLET AND ABSORPTION METHOD  Electromagnetic Spectrum. | |  |
| 9th week  Molar Absorptivity, Laws of Photometry, Spectral Presentation. | |  |
| 10th week  Absorption of Radiant Energy by Molecules  Factors Influencing Absorption of Radiant Energy. | |  |
| 11th week  Single Beam Spectrophotometer  Double Beam Spectrophotometer | |  |
| 12th week  ELECTROCHEMICAL METHODS | |  |
| 13th week  POTENTIOMETRIC METHODS  General Considerations | |  |
| 14th week  Applications of Amperometric Titrations in Pharmaceutical Substances. | |  |
| 15th week  Determination of Refractive Index of Pharmaceutical Substances. | |  |
| 16th week  Determination of Optical Activity of Pharmaceutical Substances. | |  |
| 17th week  EMISSION SPECTROSCOPY | |  |
| 18th week  FLAME SPECTROSCOPY | |  |
| 19th week  Applications of Flame Emission Spectroscopy in Pharmaceutical Analysis | |  |
| 20th week  ATOMIC ABSORPTION SPECTROSCOPY | |  |
| 21th week  Application of Atomic Absorption Spectroscopy in Pharmaceutical Analysis | |  |
| 22th week  GAS LIQUID CHROMATOGRAPHY | |  |
| 23th week  Applications of GLC in Pharmaceutical Analysis | |  |
| 24th week  Determination of Specific Organic Compounds as Impurities in  Official Pharmaceutical Substances | |  |
| 25th week  HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC) | |  |
| 26th week  Applications of HPLC in Pharmaceutical Analysis | |  |
| 27th week  SIZE EXCLUSION CHROMATOGRAPHY | |  |
| 28th week  Applications of Size Exclusion Chromatography in Pharmaceutical Analysis | |  |
| 29th week  Applications of Radioimmunoassay (RIA) in Pharmaceutical Analysis | |  |
| 30th week  Radioimmunoassay of Morphine | |  |
| **18. Practical Topics (If there is any)** | |  |
| **19. Examinations:**  ***1. Compositional:***  ***2.******True or false type of exams:***  ***3. Multiple choices:*** | | |
| **20. Extra notes:** | | |
| **21. Peer review** | | |