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**Department of : chemistry**

**College of : science**

**University of : Salahaddin**

**Subject: practical instrumental analysis**

**Course Book – 2nd stage for invironment Dept.**

**Lecturer's name : Pary Mahdy Arif**

**Academic Year: 2018/2019**

**Course Book**

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| **1. Course name** | Practical instrumental analysis | |
| **2. Lecturer in charge** | Pary | |
| **3. Department/ College** | Chemistry / Science | |
| **4. Contact** | e-mail: [pary.aref@su.edu.krd](mailto:pary.aref@su.edu.krd) | |
| **5. Time (in hours) per week** | Practical: 21 hr | |
| **6. Office hours** | 3 h | |
| **7. Course code** |  | |
| **8. Teacher's academic profile** | BSc. ( 1993)  MSc. (2004) (assist lect. ) (Analytical chemistry – flow injection analysis ) | |
| **9. Keywords** | Quantitative analysis , Spectrophotometry ,flame photometry ,PH-meter , potentimetry, separation ,conductometry . | |
| **10. Course overview:**  Chemical analysis includes the use of instrumentation to solve an analytical problem. The use of instrumentation has now become a part of chemical analysis and is applied for all areas of pure and applied science. Any single instrument could not solve an analytical problem;instead, several instrumental techniques are required to solve the problem to a maximum extent. Hence instrumentation plays an important role in the production and evaluation of new products and in the protection of consumers and the environment. | | |
| **11. Course objective:**  Students who complete this class will understand that analytical instruments are not black boxes, but rather complex tools whose utility depends in detail on how analysts both configure and apply them. Towards that end there are three primary objectives. First, students will learn facts about major classes of instruments commonly used in chemical analysis. Their knowledge will be captured by the ability to block diagram these complex pieces of equipment, and tailor the specifications to the measurement needs. Second, the course will cover the basics of instrumental calibration and quality control. Analysts will develop the ability to apply calibration curves, internal standards and the method of standard addition as needed for various measurement problems. Finally, students must learn how to select and tailor the best instrumental method given a particular measurement need. This higher level skill involves critical evaluation of the strengths and limitations of the various method, and the ability to understand the context behind a measurement need. | | |
| **12. Student's obligation**  The student are required to do at last two closed exam at the mid of each semester for practical course beside other assignments. For every experiment the student must prepare full text paper which includes theory , calculation and discussion ( report ).  We have also do practical /practical examination  . | | |
| **13. Forms of teaching**  Power point ,data show | | |
| **14. Assessment scheme**  Report : 10 mark  Theory / practical exam1 -5 mark  Theory / practical exam2 – 8 mark  Practical/practical exam -12 mark  final mark : 35 % for practical. | | |
| **15. Student learning outcome:**  Any chemist has to understand how to analyze samples - whether they are water samples, soil samples or bits of a painting. Most often chemists do these using instruments of some sort. Machines like spectrophotometry or flame photometry , conductometry ….etc. can indicate both what's in a sample (qualitative) as well as how much of something there is(quantitative). | | |
| **16. Course Reading List and References**  1-Analytical Chemistry by Gary D.Christain, 5th edition  2-Fundamental of Analytical Chemistry by Douglas A.  Skoog  3-Principles of instrumental Analysis third edition  Douglas A.Skoog  4-Analytical Chemistry Principles by John H.Kennedy  5-Chemistry Experimentals for Instrumental methods  Donald T.Sawyer  6- Instumental method of chemical analysis third edition  Galen w.Ewing | | |
| **17. The Topics:** | | **Lecturer's name** |
| / | | Lecturer's name  ex: (2 hrs)  ex: 14/10/2019 |
| **18. Practical Topics (If there is any)** | |  |
| *Course program ( first semester ) :*  Week 1:  Explain the principle and theory of methods used in instrumental analysis such has potentiometric ,counductumetric and spectrophotometric method.  Week 2 :  Explain the theory and principle of each experimental.  Week 3 :  Explain the procedure for each experimental  Week 4:  Spectrophotometric determination of potassium permanganate ,finding maximum wavelength of potassium permananate  Week 5 :  Spectrophotometric determination of chromium and manganese in steel  Week 6 :  Determination of acetyl salicylic acid by ultraviolet spectrophotometry  Week 7:  Spectrophotometric determination of ferrous ion by 1-10 phenanthroline.  Week 8 :  Conductometric titration of HCl and CH3COOH with NaOH ,determination of Ka for acetic acid  *Course program ( second semester ) :*  Week 1 :  Explain the theory of experimental  Explain the calculation of experimental  Week 2 :  Determination of sodium and potassium by flame photometery  week 3:  Determination of Ca +2 by flam photometry using standard addition method  Week 4 :  Spectrophotometric determination of aspirin  Week 5:  pH- meter:calibration and determination  Week 5 :  Application of electrogravemetric analysis  Week 6 :  Spectrophotometric determination of methyl red concentration at isobestic point  Week 7 :  Asimple spectrophotrmetrice method for the determination of ascorbic acide in pharmaceutical preparations. | | (3hrs)  14/10/2019  / /2019  / /2019 |
| **19. Examinations:** | | |
| **20. Extra notes:** | | |
| **21. Peer review** .‌‌ | | |