**Course Description**

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| **Faculty** | **Pharmacy** | | | | | | |
| **Department** | **Pharmaceutical Chemistry** | | | **Level** | | |  |
| **Course** | **Analytical Chemistry and Instrumental analysis** | **Code** | **1703207** | **Prerequisite** | | | 1703101 |
| **Credit hours** | 1 | **Theoretical** |  | **Practical** | | |  |
| **Coordinator** | Hayat Al-Btoush | **Email** |  | | | | |
| **Teachers** | Mousa Al-Magharbeh | **Emails** |  | | | | |
| **Lecture Time** |  | **Place** |  | | **Attendance mode** |  | |
| **Semester** |  | **Preparation date** |  | | **Modification Date** |  | |

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| **Abstracted Course Description** |
| The aim of this course is to study the basic concepts of analytical chemistry as units, concentration types, stoichiometric calculations and solutions. Errors in chemical analysis, gravimetric methods, titrimetric methods, neutralization titration and their applications, precipitation, complex–formation titration and introduction to electrochemistry. The official pharmacopoeias, pharmaceutical analysis and quality control. |
| **Course Goals** |
| * To develop a strong foundation in the basic concepts of analytical chemistry. * To understand and apply stoichiometric calculations and various concentration types. * To analyze errors in chemical analysis and implement appropriate correction methods. * To gain practical knowledge of gravimetric and titrimetric methods. * To apply analytical techniques to pharmaceutical analysis and quality control. |

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| **CILOs** | | | | | |
| **Knowledge** | | | | | |
| a1. Understand the fundamental concepts of analytical chemistry.  a2. Identify and differentiate between different concentration types.  a3. Analyze and correct errors in chemical analysis. | | | | | |
| **Skills** | | | | | |
| b1. Perform stoichiometric calculations related to analytical chemistry.  b2. Apply various titrimetric methods, including neutralization and complex-formation titrations.  b3. Analyze pharmaceutical samples using analytical techniques. | | | | | |
| **Competencies** | | | | | |
| c1. Demonstrate proficiency in conducting gravimetric and titrimetric analyses.  c2. Apply analytical principles to solve real-world pharmaceutical challenges.  c3. Ensure adherence to official pharmacopoeias and quality control standards. | | | | | |
| **Learning Methods** | | | | | |
| * Theoretical lectures covering fundamental concepts. * Practical laboratory sessions for hands-on experience. * Case studies to apply analytical principles in pharmaceutical contexts. | | | | | |
| **Evaluation Tools** | | | | | |
| Quizzes, Midterm exam, Final Exam | | | | | |
| **Week** | **Topics** | **Learning methods** | **Evaluation tool** | **ILOs** | **Hours** |
| **1.** | Introduction | Lecture material and notes | Exams | **A2,a3,b1,b3,c2,c3** | **3** |
| **2.** | Titrimetric analysis | Homework and Projects, Presentation, … | Assignments, | **A2,a3,b1,b3,c2,c3** | **3** |
| **3.** | Acid base titration | Lecture material and notes | Exams | **A2,a3,b1,b3,c2,c3** | **3** |
| **4.** | Aqueous acid-base titration | Homework and Assignments, Projects, Presentation, … | Exams | **A1,a2,b1,b2,c1** | **3** |
| **5.** | Non aqueous acid-base titration | Lecture material and notes | Exams | **A1,a2,b1,b2,c1** | **3** |
| **6.** | Non aqueous acid-base titration | Lecture material and notes | Exams | **A1,a2,b1,b2,c1** | **3** |
| **7.** | Complexometric titration | Homework and Assignments, Projects, Presentation, … | Exams | **A1,a2,b1,b2,c1** | **3** |
| **8.** | Midterm Exam | Lecture material and notes | Exams | **A2,a3,b1,b3,c2,c3** | **3** |
| **9.** | Precipitation titration | Lecture material and notes | Exams | **A2,a3,b1,b3,c2,c3** | **3** |
| **10.** | Precipitation titration | Lecture material and notes | Exams | **A2,a3,b1,b3,c2,c3** | **3** |
| **11.** | Oxidation reduction reactions | Lecture material and notes | Exams | **A2,a3,b1,b3,c2,c3** | **3** |
| **12.** | Oxidation reduction reactions | Lecture material and notes | Exams | **A1,a2,b1,b2,c1** | **3** |
| **13.** | Determination of metals | Presentation | Presentation, project, assignments | **A1,a2,b1,b2,c1** | **3** |
| **14.** | Determination of drugs based on their functional groups | Presentation | Presentation, project, assignments | **A1,a2,b1,b2,c1** | **3** |
| **15.** | Final Exam |  |  |  |  |
| **16.** |  |  |  |  |  |

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| |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Plan of Course Evaluation** | | | | | | | | | | **Evaluation Tools** | | **Mark** | **ILOs** | | | | | | |  |  |  |  |  |  | | **First Exam (Mid-term)** | | **30%** | **A1,A2,a3,b1,b2,b3,,c1c2,c3** |  |  |  |  |  | | **Second Exam (If available)** | |  |  |  |  |  |  |  | | **Final Exam** | | **50%** | **A1,A2,a3,b1,b2,b3,,c1c2,c3** |  |  |  |  |  | | **Activities** | |  |  | | | | | | | **Activities Evaluation** | Homework/Tasks |  | **A1,a2,b1,b2,c1** |  |  |  |  |  | | Case Study |  |  |  |  |  |  |  | | Discussion and Interactions |  |  |  |  |  |  |  | | Group Activities |  |  |  |  |  |  |  | | Laboratory Exams |  |  |  |  |  |  |  | | Presentations |  |  |  |  |  |  |  | | Quizzes |  |  |  |  |  |  |  | | Others |  |  |  |  |  |  |  | | **Total** | |  |  |  |  |  |  |  |   **Components** | |
| **Book** |  |
| **References** |  |
| **Recommended Readings** |  |
| **Electronic materials** |  |
| **Other websites** |  |