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| ***Stage: Third***  ***Pharmaceutical Technology*** | ***College of Pharmacy***  ***Department of Pharmaceutics*** | **Course Syllabus** |

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| **Name of the First Teacher of the Course**: Entidhar Jasim Muhammed  **Accademic Rank:**PhD pharmaceutics  **Degree:** Assistant Professor  **E-mail:** [**drentidhar@copharm.uobaghdad.edu.iq**](mailto:drentidhar@copharm.uobaghdad.edu.iq) |
| **Name of the Second Teacher of the Course:** Hanan Jalal Noum  **Accademic Rank:**PhD pharmaceutics  **Degree: Assistant Professer**  **E-mail:** [**hanank@copharm.uobaghdad.edu.iq**](mailto:hanank@copharm.uobaghdad.edu.iq) |
| **Name of the Third Teacher of the Course:Fatima Jalal Jawad**  **Accademic Rank:** PhD pharmaceutics  **Degree: Assistant Professer**  **E-mail:** [drfatimajalal@copharm.uobaghdad.edu.iq](mailto:drfatimajalal@copharm.uobaghdad.edu.iq) |
| **Name of the Fourth Teacher of the Course:Ruoa Abdul Hamid Naeff**  **Accademic Rank:** MSc pharmaceutics  **Degree: Lecturer**  **E-mail:** [**ruaa\_abdulhamid@copharm.uobaghdad.edu.iq**](mailto:ruaa_abdulhamid@copharm.uobaghdad.edu.iq) |
| **Name of the Fifth Teacher of the Course:Zahraa Muhsan Hamody**  **Accademic Rank:** MSc pharmaceutics  **Degree: Lecturer**  **E-mail:** [**Zahraa.sadek@copharm.uobaghdad.edu.iq**](mailto:Zahraa.sadek@copharm.uobaghdad.edu.iq) |

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| Pharmaceutical Technology | | | | | **Course Title** | |
| **Annual** | | **Semester System** | | | **Academic System** | |
| **To teach theoretical bases for the technology of preparing different dosage forms with respect to their raw materials, compositions, methods of preparation, stability, storage and uses.**  **The knowledge of different dosage forms composition, method of preparation, and selection of the appropriate dosage forms for medicinal agents** | | | | | **Course Objectives** | |
| * **Allen L, Ansel HC. Ansel's pharmaceutical dosage forms and drug delivery systems. Lippincott Williams & Wilkins, a Wolters Kluwer business. 10th ed. 2014**      * **Sprowls' American Pharmacy: An Introduction to Pharmaceutical Techniques and Dosage Form By Joseph Barnett Sprowls, Lewis W. Dittert** * **Martin AN, Sinko PJ and Singh Y, Martin's Physical Pharmacy and Pharmaceutical Sciences: Physical Chemical and Biopharmaceutical Principles in the Pharmaceutical Sciences. 6th Edition, Lippincott Williams & Wilkins ;2011** | | | | | **Textbooks** | |
| * **The United States Pharmacopoeia, 2013, The United States Pharmacopeial Convention. Rockville, MD.** * **Alexander T. Florence, David Attwood  Physicochemical Principles of Pharmacy 5th edition Pharmaceutical Press. United Kingdom 2011** * **Michael E. Aulton, Kevin M. G. Taylor (ed) Aulton's Pharmaceutics : The Design and Manufacture of Medicines 2nd edition Churchill Livingstone United Kingdom** | | | | | **Reference Books** | |
| **End Semester Examination** | **Project** | **Quizzes** | **Laboratory work** | **Theoretical Content Exam** | **Course Assessment for Semester System**  **(100%)** | |
| 60 % |  |  | 20 % | 20 % |
| **Final Examination** | **Laboratory Work** | **Second Term** | **Midterm Exam** | **First Term** | **Course Assessment for Annual System**  **(100%)** | |
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| None | | | | | | **Additional Information** |

**Weekly Schedule**

**A. First Semester**

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| **Notes** | **Laboratory Work** | **Theoretical Content** | **week** |
|  | Solutions (into body cavity, oral and external use).  **Solutions: preparation of oral and external solution**   1. **Carminative mixture for infants** 2. **Carminative mixture for adults** 3. **Iodine Solutions** | Introduction to pharmaceutical Technology,  Pharmaceutical solutions; definition, classification of pharmaceutical solution method of preparation of solution  Solubility, expression of solubility, water as a solvent  Methods of preparation of purified water |  |
|  | Solutions (into body cavity, oral and external use).  **Solutions: preparation of oral and external solution**   1. **Mist Diuretics: acidic and alkaline** 2. **drops: nasal, ear and eye** 3. **Gargles & Mouthwash** 4. **Mandl's throat paint** 5. **External solutions**   **Solution 1 and Solution 2** | Types of water  Examples of solutions  Injectables  Oral solutions  Rectal solutions  Mouth wash  Vaginal solutions  Ophthalmic solutions  Topical solutions |  |
|  | Syrups: Preparation techniques and quality evaluation.  **Syrups: sugar-based syrup and sugar free syrup**  **+quiz** | Aromatic water  Aqueous solutions containing aromatic principles; aromatic waters;  methods of preparations; stability. |  |
|  | **Syrups: Preparation techniques and quality evaluation.**   1. **Simple Syrup B.P and U.S.P** 2. **Ferrous sulfate syrup** 3. **Hypophosphite syrup** 4. **Chloral hydrate syrup** | Syrups:  Types of syrups, sugar as sweetener  Components of syrups  Method of preparation  Calculation of preservative concentration  Stability of sugar-based syrups  Artificial syrups  Examples of syrups |  |
|  | Mid term exams |  |  |
|  | Mid term exams |  |  |
|  | **Spirits and elixir: Preparation techniques and evaluation:**   1. **Aromatic spirit of ammonia** 2. **Spirit of camphor** 3. **spirit of anise** 4. **Phenobarbital elixir** 5. **Pediatric paracetamol elixir**   . | Elixirs and Spirits  Preparation of solutions using mixed solvent systems; spirits, and elixirs.  Specification  Uses  Collodions |  |
|  | **Suspensions:**  **classification +**  **Quiz** | Extracted Products  Methods of extraction  Extraction; maceration and percolation.  Types of extracted products Tinctures; fluid extracts; extracts of resins and oleoresins  Specification |  |
|  | **Suspensions: diffusible and in diffusible solid preparation suspension:**   1. **Boric acid suspension** 2. **Bismuth carbonate suspension** 3. **Phenacetin suspension** 4. **Aspirin suspension** | Coarse dispersion; suspensions.  Definition, reason for suspension  Routes of administration of suspensions, specification |  |
|  | 1. **Preparation of Suspensions containing precipitate forming liquid:**   **Tincture of tolu balsam suspension**   1. **Suspensions containing poorly wettable solid:**   **Calamine suspension**  **Compound Sulphur lotion**   1. **Dispersions of oil in inhalation** 2. **Suspensions prepared by chemical reaction** | Coarse dispersion.  Rate of sedimentation  Factors affecting sedimentation  Sedimentation volume, degree of sedimentation  Flocculation  Method to control flocculation |  |
|  | **Lab final exam** | Colloidal dispersions;  Definition particle size range classification lyophilic; lyophobic, amphiphilic  Methods of preparations  Polymers and SAA  Examples |  |
|  | **Final course exam** |  |  |
|  | **Final course exam** |  |  |
|  | **Final course exam** |  |  |

**Weekly Schedule**

**B. Second Semester**

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| **Notes** | **Laboratory Work** | **Theoretical Content** | **week** |
|  | **Emulsions: Preparation techniques and quality evaluation:**  **1- Olive oil and**  **Ferric ammonium citrate**  **2-castor oil**  **3- turpentine oil** | Emulsions.  definition of emulsion  types of emulsion  O/W and W/O with examples and terminology  classification of emulsions   * according to physical state * according to route ofadministration   disadvantage of emulsion  methods of emulsification; |  |
|  | **Emulsions: Preparation techniques and quality evaluation:**  **1-** **Castor oil, Oleic acid and**  **Calcium hydroxide solution**  **Emulsion**  **2**- **Liquid paraffin emulsion**  **3-** **White liniment** | Emulsions  theory of emulsion  emulsifying agents EA types  Calculation of concentration of SAA, HLB system;  Methods of preparation of emulsion Small Scale  Large scale  stability of emulsions  storage of emulsion  preservation |  |
|  | **Quiz+**  **Suppositories: Preparation techniques and quality evaluation:**  **1- Glycerogelatin supp. B.P and USP**  **2-PEG suppository** | Suppositories. **Definition**  **Advantages Route of administration Site of drug delivery**  **Supp. Shapes**  **Types and example of Supps.**  **Fate of Supps**  **Supps. Bases**  **Ideal properties** |  |
|  | **Rectal Suppositories.**   1. **Bismuth Subnitrate suppository** 2. **Tannic acid suppository** | Suppositories.  Types of bases  Methods of preparation  Supps Molds  Determination of the amount of base  Vaginal Inserts  Packaging and Storage |  |
|  | **Mid term exam** |  |  |
|  | **Mid term exam** |  |  |
|  | **Quiz+**  **Semisolid dosage forms: Preparation techniques and quality evaluation:**  **1- Simple ointment B.P**  **2- Zinc oxide ointment**  **3- sulfur ointment**  **4- Zinc and castor oil ointment B.P** | Semisolid dosage forms.  Ointments ,  introduction  types of ointment bases(USP)  comparison between the ointment bases  Selection of ideal ointment base  Preparation of ointment  pastes definition method of preparation  ophthalmic ointment (sterile ointment)  Compendial Requirements for Ointments |  |
|  | **Semisolid dosage forms preparation of:**  **1-lip balm**  **2-face wash**  **3- cold and vanishing creams**  **4- Zinc oxide and salicylic acid pastes**  **5-** **Zinc oxide gel** | Creams, gels, emulgel  Creams ( vanishing creams) Definition  Emulgel  gels definition  method of preparation |  |
|  | **Quiz+**  **Powders: Preparation techniques and quality evaluation:**  **1-** **Phenacetin and**  **Caffeine powder**  **2-** **Codeine phosphate powder**  **3-** **Hyoscine hydrobromide powder** | Powder dosage forms.  Route of administration  Uses of powders  Characterization of powders  Methods for determination of particle size & Shape, Particle size reduction  Blending of powders,  Powder papers  Medicated powders  Bulk powders  Divided powders  Route of administration  Granules  Advantages of granules  Preparation of granules  Effervescent granules  Methods of preparation |  |
|  | **Capsules: Preparation techniques and quality evaluation:**  **1**- **Ephedrine HCL capsule**  **2-** **Brufen, Panadol and**  **Prednisolone capsules**  **3-** **Hyoscine HBr capsules** | Pharmaceutical capsules  Advantages of capsules  Types of capsules (Shell)   * Hard gelatin capsules   manufacture  Preparation of filled hard gelatin capsules   * Soft gelatin capsules * Enteric coated capsules   Counting of capsules  Storage of capsules  Examples of some official capsules |  |
|  | Lab Final exam | * Incompatibilities in pharmaceutical dosage forms   types of incompatibility  Physical Incompatibility  Chemical incompatibility   * Aerosols and Foams   main advantage of  components of aerosols and example  Pharmaceutical foams  advantages , type of foams and example   * Pharmaceutical Cosmetics   Antiacne  Antidandruff  Sun filters |  |
|  | Final course exam |  |  |
|  | Final course exam |  |  |
|  | Final course exam |  |  |