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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** |
| **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** |
| **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 |
| **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** |
| **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** |

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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 solventMethods 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 solutionsTopical solutions  |  |
|  | Syrups: Preparation techniques and quality evaluation.**Syrups: sugar-based syrup and sugar free syrup****+quiz**  | Aromatic waterAqueous 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 preparationCalculation of preservative concentration Stability of sugar-based syrups Artificial syrupsExamples 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 SpiritsPreparation of solutions using mixed solvent systems; spirits, andelixirs. Specification Uses Collodions |  |
|  | **Suspensions:** **classification +****Quiz** | Extracted ProductsMethods of extraction Extraction; maceration and percolation.Types of extracted products Tinctures; fluid extracts; extracts of resins and oleoresinsSpecification  |  |
|  | **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 SAAExamples  |  |
|  | **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 terminologyclassification of emulsions * according to physical state
* according to route ofadministration

disadvantage of emulsionmethods 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** | Emulsionstheory of emulsion emulsifying agents EA types Calculation of concentration of SAA, HLB system;Methods of preparation of emulsion Small Scale Large scale stability of emulsionsstorage of emulsionpreservation |  |
|  | **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 basesMethods of preparationSupps MoldsDetermination of the amount of baseVaginal InsertsPackaging 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 basesSelection 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, emulgelCreams ( vanishing creams) Definition Emulgel gels definitionmethod 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 administrationUses of powdersCharacterization of powdersMethods for determination of particle size & Shape, Particle size reductionBlending of powders, Powder papersMedicated powdersBulk powdersDivided powdersRoute of administration Granules Advantages of granules Preparation of granulesEffervescent 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 capsulesAdvantages of capsulesTypes of capsules (Shell) * Hard gelatin capsules

manufacturePreparation of filled hard gelatin capsules* Soft gelatin capsules
* Enteric coated capsules

Counting of capsulesStorage of capsulesExamples 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 examplePharmaceutical foams advantages , type of foams and example* Pharmaceutical Cosmetics

Antiacne Antidandruff Sun filters  |  |
|  | Final course exam  |  |  |
|  | Final course exam  |  |  |
|  | Final course exam  |  |  |