



Course Syllabus

Name of the First Teacher of the Course: Dr Mohammed Sabbar

Academic Rank: Lecturer

Degree: PhD in Pharmaceutics

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Name of the Second Teacher of the Course: Dr Mohammed Sattar

Academic Rank: Lecturer

Degree: PhD in Pharmaceutics

Email: mohammed.jabbar@uobasrah.edu.iq

Name of the Third Teacher of the Course: Ahmed Abdulkarem

Academic Rank: Assistant Lecturer

Degree: MSc in Pharmaceutics

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Course Title	Pharmaceutical Calculation				
Academic System	Semester				
Course Objective	It involves computation of pharmaceutical ingredients, dosage forms, pharmaceutical formulations of extemporaneous compounding, and biological parameters of drug substances. The course teaches calculations for dilution and concentration of different types of liquids and those involved in preparing isotonic solutions, electrolyte solutions and intravenous admixtures.				
Textbooks	Pharmaceutical Calculation by Stoklosa; Latest edition.				
Reference Books	Pharmaceutical calculations, by Ansel				
Course Assessment for Semester System (100%)	Theoretical Content Exam	Laboratory Work	Quizzes	Project	End Semester Examination
	25	25	-	-	50
Additional Information	The module is given on the second semester for the first year student in two hours of theory and two hours practical laboratory work per week				

Weekly Schedule

Week	Theoretical Content	Laboratory Work	Notes
1	Dilution and concentration of pharmaceutical preparations. (five weeks)	Demonstration of different glass wares and equipments used in the field of pharmacy.	
2		Pharmaceutical measurements.	
3		Volume measurements.	
4		Preparation of aromatic waters. (Two weeks).	
5			
6	Isotonic solutions. (Three weeks)	Preparation of simple solutions.	
7		Reducing and enlarging prescription contents. (Two weeks).	
8			
9	Electrolyte solutions (milliequivalents, millimoles and milliosmoles). (Three weeks)	Percentages in calculating prescription content. (Two weeks).	
10			
11		Percentages in calculating prescription contents. (Two weeks)	
12	Constituted solutions, I.V admixtures and flow rate calculations. (4 weeks).		
13		Stock solutions and dilution technique during dispensing technique. (Three weeks)	
14			
15			



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Name of the Third Teacher of the Course: Ahmed Abdulkarem

Academic Rank: Assistant Lecturer

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Course Title	Principles of Pharmacy Practice				
Academic System	Semester				
Course Objective	<p>Involves brief information about old pharmacy. It teaches kinds of numbers, abbreviations that are commonly used in prescriptions and their meanings. In this course the students will understand the components of typical prescription, the different unit systems and the relation between these systems. Students will also be familiar with the methods and tools of measuring weights and volumes, and how to calculate doses on different bases and know how to reduce or enlarge formulas; they will be able to describe values in percentage and ratio strength.</p>				
Textbooks	Pharmaceutical Calculation by Stoklosa; Latest edition.				
Reference Books	Pharmaceutical calculations , by Ansel				
Course Assessment for Semester System (100%)	Theoretical Content Exam	Laboratory Work	Quizzes	Project	End Semester Examination
	25	-	5	-	70
Additional Information	The module is given on the first semester for the first year student as two hours of theoretical lectures per week				

Weekly Schedule

Week	Theoretical Content	Notes
1 & 2	Some fundamentals of measurements and calculation.	4h
3 & 4	Interpretation of prescription or medication orders.	4 h
5 & 6	The metric system	4 h
7 & 8	Calculation of doses.	4 h
9 & 10	Reducing and enlarging formulas.	4 h
11 & 12	Density, specific gravity and specific volume.	4 h
13-15	Percentage and ratio strength calculation.	6 h



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Name of the Second Teacher of the Course: Dr Ahmed Najim

Academic Rank: Lecturer

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Name of the Third Teacher of the Course: Assistant Lecturer Ahmed Sami

Academic Rank: Assistant Lecturer

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Course Title	Physical Pharmacy I				
Academic System	Semester				
Course Objective	<p>To understand the application of quantitative and theoretical principles of the physical characters of matter in the practice of pharmacy.</p> <p>It aids the pharmacists in their attempt to predict the solubility, compatibility and biological activity of drug products.</p> <p>As a result of this knowledge it will help in the development of new drugs and dosage forms as well as in improvement of various modes of administration.</p>				
Textbooks	<i>Physical Pharmacy by Alfred Martin et al; (Latest edition).</i>				
Reference Books	<i>Physicochemical Principles of Pharmacy, by Alexander T Florence</i>				
Course Assessment for Semester System (100%)	Theoretical Content Exam	Laboratory Work	Quizzes	Project	End Semester Examination
	25	25	-	-	50
Additional Information	<p>The module is given on the first semester for the second year student in three hours of theory and two hours practical laboratory work per week</p>				

Weekly Schedule

Week	Theoretical Content	Laboratory Work	Notes
1	States of matter, binding forces between molecules, gases, liquids, solid and crystalline matters.	Expression of concentrations in pharmaceutical preparations	
2	Phase equilibria and phase rule.	Two component systems containing liquid phases. (2 weeks)	
3	Thermal analysis.		
4	Thermodynamics, first law.	Three component systems. (2 weeks)	
5	thermochemistry, second law, third law.		
6	Free energy function and applications.	Tie linear for three component systems. (2 weeks)	
7	Solutions of non-electrolytes, properties, ideal and real solution.		
8	Colligative properties, molecular weight determination.	Partition coefficient: Measurements and evaluation. (2 weeks)	
9	Solution of electrolytes, properties, Arrhenius theory of dissociation, theory of strong electrolytes.		
10	Ionic strength, Debye-Huchle theory, coefficients for expressing colligative	Solubility methods. (2 weeks)	

	properties.		
11	Ionic equilibria, modern theories of acids, bases and salts, acid-base equilibria.		
12	Calculation of pH, acidity constants.	Buffer solutions. (2 weeks)	
13	The effect of ionic strength and free energy		
14	Buffered and isotonic solutions: Buffer equation; buffer capacity;	Determination of solubility product constant of slightly soluble salts. (2 weeks)	
15	methods of adjusting tonicity and pH; buffer and biological system.		



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Course Title	Physical Pharmacy II				
Academic System	Semester				
Course Objective	<p>To understand the application of quantitative and theoretical principles of the physical characters of matter in the practice of pharmacy.</p> <p>It aids the pharmacists in their attempt to predict the solubility, compatibility and biological activity of drug products.</p> <p>As a result of this knowledge it will help in the development of new drugs and dosage forms as well as in improvement of various modes of administration.</p>				
Textbooks	<i>Physical Pharmacy by Alfred Martin et al; (Latest edition).</i>				
Reference Books	<i>Physicochemical Principles of Pharmacy, by Alexander T Florence</i>				
Course Assessment for Semester System (100%)	Theoretical Content Exam	Laboratory Work	Quizzes	Project	End Semester Examination
	25	25	-	-	50
Additional Information	<p>The module is given on the second semester for the second year student in three hours of theory and two hours practical laboratory work per week</p>				

Weekly Schedule

Week	Theoretical Content	Laboratory Work	Notes
1	Solubility and distribution phenomena, solvent-solute interactions, solubility of gases in liquids.	Solubilization of components of pharmaceutical preparations. (2 weeks)	
2	Solubility of liquids in liquids, solubility of non-ionic solids in liquids.		
3	Distribution of solutes between immiscible solvents.	Solubilization of Aspirin. (2 weeks)	
4	Complexation, classification of complexes.		
5	Methods of analysis, thermodynamic treatment of stability constants.	Review and tutorial	
6	Kinetics, rate and orders of reactions.	Rate kinetic: Application in stability of pharmaceutical stability.	
7	Influence of temperature and other factors on reactions rate.	Aspirin stability	
8	Decomposition of medicinal agents and accelerated stability analysis.	Review and tutorial	
9	Interfacial phenomena, liquid interfaces, surface free energy, measurement of interfacial tension,	Surface tension: measurements and calculations. (2 weeks)	

	spreading coefficient, surface active agents and wetting phenomena.		
10	Colloids, dispersed system and its pharmaceutical application.	Effect of Salt on the Solubility of Nonelectrolyte	
11	Types of colloidal systems, kinetic properties, diffusion, zeta potential, solubilization.	Determination of the Critical Micelle Concentration of Surface Active Material	
12	Micrometrics, particle size, methods of determining particle size, particle shape and surface area, porosity, density.	Review and tutorial	
13	Rheology, Newtonian systems, thixotropy measurement.	Viscosity: Measurements and calculation. (2 weeks)	
14	Negative thixotropy, determination of thixotropy.		
15	Polymer science, definitions pharmaceutical applications, molecular weight averages.	Adsorption isotherm.	

Ministry of Higher Education
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College of Pharmacy
Department of Pharmaceutics
Stage: **Third**

Course Syllabus

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Name of the Third Teacher of the Course:

Academic Rank:

Degree:

Email:

Course Title	Pharmaceutical Technology I				
Academic System	Semester				
Course Objective	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.				
Textbooks	<i>Pharmaceutical Dosage forms and Drug Delivery Systems By Haward A. Ansel; latest edition..</i>				
Reference Books	<i>Sprowel's American Pharmacy; Latest edition</i>				
Course Assessment for Semester System (100%)	Theoretical Content Exam	Laboratory Work	Quizzes	Project	End Semester Examination
	25	25	-	-	50
Additional Information	The module is given on the first semester for the third year student in three hours of theory and two hours practical laboratory work per week				

Weekly Schedule

Week	Theoretical Content	Laboratory Work	Notes
1	Dispersed systems: their classification; comparisons between different systems.	Solutions (Into body cavity, oral and external use). Two weeks	
2	Solutions and types of solutions.		
3	Solubility: Factors affecting solubility; expression of dissolution; dissolution rate versus solubility; preparation of solutions containing non-volatile materials.	Syrups: Preparation techniques and quality evaluation. Two weeks	
4	Official solutions; classification of official solutions; preparation and uses.		
5	Aqueous solutions containing aromatic principles; aromatic waters; methods of preparations; stability.	Review and tutorial	
6	Syrups: sugar based syrups; artificial and sorbitol based syrups; stability of syrups.	Elixirs: Preparation techniques and quality evaluation. Two weeks	
7	Definition and methods of clarification; filter aids in clarification.		
8	Preparation of solutions using	Spirits: Preparation techniques and quality	

	mixed solvent systems; spirits, and elixirs.	evaluation. Two weeks	
9	Extraction; maceration and percolation.		
10	Tinctures; fluid extracts;.	Review and tutorial	
11	Extracts of resins and oleoresins.	Suspensions: Preparation techniques and quality evaluation. Three weeks	
12	Colloidal dispersions; lyophilic; lyophobic.		
13	Colloidal dispersions; lyophilic; lyophobic.		
14	Coarse dispersion; suspensions.	Dispersion of oils in inhalations. Two weeks	
15	Coarse dispersion; suspensions.		



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Name of the Third Teacher of the Course:

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Course Title	Pharmaceutical Technology II				
Academic System	Semester				
Course Objective	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; in addition to define and characterize the possible incompatibilities that may occur in dosage forms.				
Textbooks	<i>Pharmaceutical Dosage forms and Drug Delivery Systems By Haward A. Ansel; latest edition..</i>				
Reference Books	<i>Sprowel's American Pharmacy; Latest edition</i>				
Course Assessment for Semester System (100%)	Theoretical Content Exam	Laboratory Work	Quizzes	Project	End Semester Examination
	25	25	-	-	50
Additional Information	The module is given on the second semester for the third year student in three hours of theory and two hours practical laboratory work per week				

Weekly Schedule

Week	Theoretical Content	Laboratory Work	Notes
1	Emulsions; purpose of emulsification; methods of emulsification; emulsifying agents; HLB system; stability of emulsions. Three weeks.	Emulsions: Preparation techniques and quality evaluation. Two weeks	
2			
3		Suppositories: Preparation techniques and quality evaluation. Two weeks	
4	Lotions; liniments and collodions. Two weeks		
5		Review and tutorial	
6	Suppositories. Three weeks	Powders: Preparation techniques and quality evaluation. Two weeks.	
7			
8		Capsules: Preparation techniques and quality evaluation. Two weeks	
9	Powdered dosage forms. Three weeks.		
10		Review and tutorial	
11		Semisolid dosage forms: Preparation techniques and quality evaluation. 4 weeks.	
12	Semisolid dosage forms. Three weeks.		
13			

14			
15	Incompatibilities in pharmaceutical dosage forms.	Review and tutorial	





Course Syllabus

Name of the First Teacher of the Course: Dr Audy Sajad

Academic Rank: Lecturer

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Name of the Third Teacher of the Course: Ahmed Abdulkarem

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Course Title	Biopharmacy				
Academic System	Semester				
Course Objective	<p>The course deals with the physical and chemical properties of drug substance, dosage form and the biological effectiveness of the drug or drug product upon administration, including drug availability in the human or animal body from a given dosage form.</p> <p>The pharmacokinetic part of the course deals with the time-course of the drug in the biological system, and quantification of drug concentration pattern in normal subjects and in certain disease states.</p>				
Textbooks	<i>Shargel L, Yu AB, (Eds.), Applied Biopharmaceutics and Pharmacokinetics; Latest edition.</i>				
Reference Books	<i>Aulton Biopharmaceutics.</i>				
Course Assessment for Semester System (100%)	Theoretical Content Exam	Laboratory Work	Quizzes	Project	End Semester Examination
	25	25	-	-	50
Additional Information	<p>The module is given on the first semester for the fourth year student in two hours of theory and two hours practical laboratory work per week</p>				

Weekly Schedule

Week	Theoretical Content	Laboratory Work	Notes
1	Introduction to biopharmaceutics.	Preparation of calibration curve of salicylic acid.	
2	Biopharmaceutic aspects of products	<i>In vitro</i> evaluation of bulk laxative.	
3	Drug absorption; mechanisms of absorption.	<i>In vitro</i> evaluation of antacids.	
4	Physicochemical factors; dissolution rate; effects of excipients; type of dosage forms.	Dissolution of tablets. (two weeks)	
5	One compartment open model.		
6	Multicompartment models.	Review and tutorial	
7	Pharmacokinetics of drug absorption.	Determination of pharmacokinetic parameters from CP-time by residual method. (Two weeks)	
8	Bioavailability and bioequivalence.		
9	Clearance of drugs from the biological systems.	Determination of pharmacokinetic parameters from CP-time by trapezoidal method. (Two weeks)	
10	Hepatic elimination of drugs.		
11	Protein binding of drugs.	Determination of pharmacokinetic parameters from urine excretion samples. (Two weeks)	
12	Intravenous infusion		

13	Multiple dosage regimens.	Hydrolysis of aspirin in buffer pH 6.8. (Two weeks)	
14	Non-linear pharmacokinetics.		
15	Dosage adjustment in renal diseases.	Review and tutorial	





Course Syllabus

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Name of the Third Teacher of the Course: Malath Alshawi

Academic Rank: Assistant Lecturer

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Course Title	Industrial Pharmacy I				
Academic System	Semester				
Course Objective	The subject aim to teach pharmacy students the steps and lines upon which the preformulation processing of pharmaceutical dosage forms. This fundamental coarse provide the required principles to integrate knowledge of Pharmaceutical Technology in preformulation of perfect dosage form. It includes milling, mixing, drying and filtration, besides sterilization to achieve a proper processing of dosage forms.				
Textbooks	<i>The Theory and Practice of Industrial Pharmacy by Leon Lachman et al.(Latest edition).</i>				
Reference Books	<i>Aulton Pharmaceutics</i>				
Course Assessment for Semester System (100%)	Theoretical Content Exam	Laboratory Work	Quizzes	Project	End Semester Examination
	25	25	-	-	50
Additional Information	The module is given on the second semester for the fourth year student in three hours of theory and two hours practical laboratory work per week				

Weekly Schedule

Week	Theoretical Content	Laboratory Work	Notes
1	Principles of pharmaceutical processing; mixing; fluid mixing; flow characteristics; mechanisms of mixing; mixing equipments; batch and continuous mixing; mixer selection; solid mixing theory and particulate solid variables; forces and mechanisms. Three weeks	Introduction in industrial pharmacy and pre-formulation.	
2		Effervescent granules: Preparation and characterization.	
3		Flow properties and rheology of granules.	
4	Milling; pharmaceutical application; size measurement methods; theory and energy of comminution; types of mills; factors influencing milling; selection of mill techniques; specialized drying methods. Three weeks	Tablet dosage form: Preparation and characterization.	
5		Review and tutorial	
6		Evaluation of tablets.	
7	Drying: definition; purpose; humidity measurement; theory of drying; drying of solids, and classification of dryer; specialized drying methods. Two weeks	Preparation of children aspirin by wet granulation method.	
8		Sustained release dosage forms: Preparation and characterization.	

9	Clarification and filtration: Theory; filter media; filter aids; selection of drying method; non-sterile and sterile operations; integrity testing; equipments and systems (commercial and laboratory). Two weeks	Coating techniques of tablets.	
10		Review and tutorial	
11	Sterilization; validation of methods; microbial death kinetics; methods of sterilization (thermal and non-thermal); mechanisms; evaluation. Two weeks	Introduction in industrial pharmacy and pre-formulation.	
12		Effervescent granules: Preparation and characterization.	
13	Pharmaceutical dosage form design; pre-formulation; preliminary evaluation; bulk characterization; solubility and stability analysis.	Flow properties and rheology of granules.	
14	Pharmaceutical dosage forms; sterile products; development; formulation; production; processing; quality control. Two weeks	Tablet dosage form: Preparation and characterization.	
15		Review and tutorial	



Course Syllabus

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Name of the Third Teacher of the Course: Malath Alshawi

Academic Rank: Assistant Lecturer

Degree: MSC in Industrial Pharmacy

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Course Title	Industrial Pharmacy II				
Academic System	Semester				
Course Objective	The course enable technical setup for coordination of standards for formulation of typical dosage forms and the principles needed to learn mass production of different pharmaceutical dosage forms. The syllabus includes different dosage forms like tablets, capsules, aerosols, emulsion, etc, besides the advanced techniques like enteric coating and micro-encapsulation.				
Textbooks	<i>The Theory and Practice of Industrial Pharmacy by Leon Lachman et al.(Latest edition).</i>				
Reference Books	<i>Aulton Pharmaceutics</i>				
Course Assessment for Semester System (100%)	Theoretical Content Exam	Laboratory Work	Quizzes	Project	End Semester Examination
	25	25	-	-	50
Additional Information	The module is given on the first semester for the fifth year student in three hours of theory and two hours practical laboratory work per week				

Weekly Schedule

Week	Theoretical Content	Laboratory Work	Notes
1	Pharmaceutical dosage forms: Tablets; role in therapy; advantages and disadvantages; formulation; properties; evaluation; machines used in tableting; quality control; problems; granulation, and methods of production; excipients, and types of tablets. Three weeks.	Direct compression method for preparation of tablets. Two weeks	
2			
3		Wet granulation method for preparation of tablets. Two weeks	
4	Tablet coating; principles; properties; equipments; processing; types of coating (sugar and film); quality control, and problems.		
5	Capsules: Hard gelatin capsules; materials; production; filling equipments; formulation; special techniques.	Dry granulation method for preparation of tablets. Two weeks.	
6	Soft gelatin capsules: Manufacturing methods; nature of capsule shell and content; processing and control; stability.		
7	Micro-encapsulation; core and coating materials; stability; equipments and methodology.	Review and tutorial	
8	Modified (sustained release) dosage forms; theory and concepts; evaluation and testing; formulation.	Evaluation of tablets. Two weeks.	
9	Liquids: Formulation; stability and equipments.		

10	Suspensions: Theory; formulation and evaluation.	Capsules dosage form: Preparation and evaluation. Three weeks	
11	Emulsions: Theory and application; types; formulation; equipments and quality control.		
12	Semisolids: Percutaneous absorption; formulation; types of bases (vehicles) preservation; processing and evaluation.		
13	Suppositories: Rectal absorption; uses of suppositories; types of bases; manufacturing processes; problems and evaluation.	Parenteral dosage forms. Two weeks.	
14	Pharmaceutical aerosols: Propellants; containers; formulation; types and selection of components; stability; manufacturing; quality control and testing. Two weeks		
15		Review and tutorial	

Ministry of Higher Education
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College of Pharmacy
Department of Pharmaceutics
Stage: **Fifth**

Course Syllabus

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Name of the Second Teacher of the Course: Dr Audy Sajad

Academic Rank: Lecturer

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Name of the Third Teacher of the Course: Abdulrazaq Hameed

Academic Rank: Assistant Lecturer

Degree: MSc in Drug delivery

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Course Title	Dosage form design				
Academic System	Semester				
Course Objective	This course enables students to understand the principles and factors that influence design of dosage forms; and the applications of these principles in the practice of pharmaceutical industry.				
Textbooks	<i>Pharmaceutical Dosage Forms and Drug Delivery Systems by Haward A. Ansel; Latest edition</i>				
Reference Books	<i>Pharmaceutics , by Aulton</i>				
Course Assessment for Semester System (100%)	Theoretical Content Exam	Laboratory Work	Quizzes	Project	End Semester Examination
	25	-	5	-	70
Additional Information	The module is given on the second semester for the fifth year student in two hours of theory per week				

Weekly Schedule

Week	Theoretical Content	Notes
1	Pharmaceutical consideration: The need for the dosage form.	1
1 & 2	General consideration for the dosage form.	3
3	Pre-formulation; physical description, microscopic examination.	2
4	Melting point; phase rule; particle size; polymorphism; solubility.	2
5	Permeability; pH; partition coefficient; pka; stability; kinetics; shelf life.	2
6	Rate reaction; enhancing stability.	2
7	Formulation consideration: Excipients; definition and types; appearance; palatability; flavoring.	2
8	Sweetening; coloring pharmaceuticals; preservatives; sterilization; preservatives selection.	2
9 & 10	Biopharmaceutical considerations: Principle of drug absorption; dissolution of the drugs.	4
11 & 12	Bioavailability and bioequivalency; FDA requirements.	3
12 & 13	Assessment of bioavailability; bioequivalence among drug products.	3
14 & 15	Pharmacokinetic principles: Half-life; clearance; dosage regimen considerations.	4

Ministry of Higher Education
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College of Pharmacy
Department of Pharmaceutics
Stage: **First**

Course Syllabus

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Course Title	Pharmaceutical Biotechnology				
Academic System	Semester				
Course Objective	This course enables students to understand the general introduction, formulation factors, and the biopharmaceutical considerations that influence the biotechnological products.				
Textbooks	❖ Pharmaceutical biotechnology (J . A . Crommelin , Robert D. Syinder)				
Reference Books	❖ Pharmaceutical Dosage Forms and Drug Delivery Systems by Haward A. Ansel; Latest edition				
Course Assessment for Semester System (100%)	Theoretical Content Exam	Laboratory Work	Quizzes	Project	End Semester Examination
	25	-	5	-	70
Additional Information	The module is given on the second semester for the fifth year student in one hour of theory per week				

Weekly Schedule

Week	Theoretical Content	Notes
1	Biotechnology - introduction	
2	Pre –formulation considerations of biotechnology product	
3	Microbial considerations	
4-6	Formulation materials and considerations	
7-11	biopharmaceutical considerations	
12-15	Pharmacokinetics of peptides and proteins	