Republic of Iraq
Ministry of Higher Education & Scientific Research
Supervision and Scientific Evaluation Directorate
Quality Assurance and Academic Accreditation
International Accreditation Dept.

Academic Program Specification Form For The Academic Year 2015-2016

Universitiy: Al Mustansiriya University
College : Pharmacy / Dep of Pharmaceutics
Number Of Departments In The College : 6
Date Of Form Completion : 17th-May-2016

Dean's Name

Assiss. Prof. Dr Monder Faisal

Date: 01 / 5 / 2016

Signature

Dean's Assistant For Scientific Affairs
Lecturer Dr. Anam Sameh Arif

Date: 01 / 5 / 2016
Signature

The College Quality Assurance and University Performance Manager
Assiss.Prof Dr
Date: 01 / 5 / 2016
Signature

Quality Assurance And University Performance Manager
Date: 01 / 5 / 2016
Signature

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Program Specification provides a concise summary of the main features of the program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the program.

1. Teaching Institution	Al Mustansiriya University
2. University Department/Centre	College of pharmacy
3. Program Title	Pharmaceutics
4. Title of Final Award	BSc in pharmacy science
5. Modes of Attendance offered	Semesters
6. Accreditation	ACPE
7. Other external influences	Committee of Deans Colleges of Pharmacy
8. Date of production/revision of this specification	2016
9. Aims of the Program	
1- Teaching the students the fundamentals of Pharmaceutics principles and calculations	
2- Teaching the students the physico-chemical properties of the drug and excipients used in the dosage form formulation.	
3-Teaching the students basic technology for compounding different pharmaceutical preparation	
4-Teaching the students the biopharmaceutics and pharmacokinetics of the drug in the body.	

5-Teaching the students the manufacturing process of different dosage forms and methods of their evaluations.

6-Teaching the student the principle of dosage form design.

7-Teaching the student the principle of pharmaceutical biotechnology, biopharmaceutical product formulation and their routes of administration.

8-Teaching the student the fundamentals of training in pharmacy and how dispense the prescriptions.

9- Supervise the graduation projects.

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Knowledge and Understanding

A1. Comprehensive acquaintance about principle of pharmacy and calculation
A2. Evaluation of physical properties of drugs and other excipients used in drug formulation.
A3. Comprehensive knowledge about the preparation of dosage forms
A4. Bioavailability of the drug
A5. The principles of drug manufacturing.
A6. The use of biotechnology in pharmaceutical fields

B. Subject-specific skills

B1. Solving special problems related to pharmaceutical calculations
B2. Preparing different dosage forms in lab on small scale
B3. Manufacturing and evaluation of tablets
B4. Dispensing of prescriptions

Teaching and Learning Methods

1- Lectures by using the smart boards, white boards ,
2- Demonstrating scientific videos
3- laboratory work
4- Writing scientific reports
5- Project and giving presentations on specific topics
6- Training in pharmacy
7- Scientific poster

Assessment methods

1- Quizzes
2- Oral discussions
3- Mid-term exams
4- Small group assignments
5- Final exam

C. Thinking Skills

C1. Discussions within small groups
C2. Presentations
C3. Small projects

D. General and Transferable Skills (other skills relevant to employability and personal development)
D1. Using online resources
D2. Literature survey

Teaching and Learning Methods

Lectures by using the smart screens, white boards , videos and laboratory work

11. Programme Structure				12. Awards and Credits
Level/Year	Course or Module Code	Course or Module Title	Credit rating	
1st	50303103	Principle of pharmacy	2 hr Theory	Bachelor Degree Requires (x) credits
2nd	50303203	Physical Pharmacy I	2 hr Theory + 2 hr practical	
3rd	50303302	Pharmaceutical Technology I	3 hr Theory + 2 hr practical	
4th	50303403	Biopharmaceutics	2 hr Theory + 2hr practical	
5th	50303503	Industrial pharmacy II	3 hr Theory + 2 hr practical	
1st	50303108	Pharmaceutical calculation	2 hr Theory + 2 hr practical	
2nd	50303208	Physical pharmacy II	3 hr Theory + 2 hr practical	
3rd	50303308	Pharmaceutical Technology II	3 hr Theory + 2 hr practical	
4th	50303409	Industrial Pharmacy I	3 hr Theory + 2 hr practical	
5 th	50303508	Dosage form design	2 hr Theory	
5 th	50303507	Pharmaceutical biotechnology	1 hr Theory	

13. Personal Development Planning

Certain modules within the program are related to personal development planning. Students will also be given the opportunity and encouraged to engage in vocationally relevant qualifications. Work-based elements are embedded throughout a range of modules, which allow the student to reflect on their vocational development.

14. Admission criteria.

Central Acceptance through the Ministry of Higher Education and Scientific Research / Iraq and according to the student grades.

15. Key sources of information about the program

1- Pharmaceutical Calculation, Howard C Ansel,13th Edition 2010, Wolters Kluwer Lippincott Williams &Wilkins

2- Martin´s physical pharmacy and pharmaceutical sciences, Patrick J. Sinko. Wolters Kluwer., Lippincott Williams &Wilkins. Philadelphia. 2011.

3- Lab manual for physical pharmacy adopted by the department of Pharmaceutics.

4- Lewis W. Dittert, "American pharmacy", Lippincott. Company, 1974.

5- Ansel'sPharmaceutical dosage forms and drug delivery systems 9th edition by Howard C. Ansel. Sinko .Wolters Kluwer, Lippincott Williams &Wilkins. Philadelphia. 2011.

6- Lab manual for pharmaceutical technology by the department of pharmaceutics

7- Aulton's Pharmaceutics: The Design and Manufacture of Medicines, Third edition, Michael E. Aulton (Author). Churchill, Livingstone- Elsevier.

8- Shargel L., Yu AB., (Eds). Applied Biopharmaceutics and Pharmacokinetics, Fifth edition, International Edition 2005

9- Lab manual for biopharmaceutics

10- Theory and practice in industrial pharmacy by Lachmann (2009).

11- Pharmaceutical biotechnology by J.A. Crommelin, Robert D. Syinder.

12- Pharmaceutical biotechnology Fundamentals and Applications 4th Edition by Daan J. A. Crommelin, Robert D. Sindelar, bernd Meibohm. 2013.

Curriculum Skills Map																		
please tick in the relevant boxes where individual Programme Learning Outcomes are being assessed																		
				Programme Learning Outcomes														
Year / Level	Course Code	Course Title	Core (C) Title or Option (O)	Knowledge and understanding				Subject-specific skills				Thinking Skills				General and Transferable Skills (or) Other skills relevant to employability and personal development			
				A1	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**	**D1**	**D2**	**D3**	**D4**
1st	50303103	**Principle of Pharmacy**	**C**	√	√	√	√	√	√	√		√	√			√	√		
	50303108	**Pharmaceutical Calculation**	**C**	√	√	√	√	√	√	√	√	√	√	√		√	√		
2nd	50303203	**Physical Pharmacy I**	**C**	√	√	√	√	√	√	√	√	√	√	√		√	√		
	50303208	**Physical pharmacy II**	**C**	√	√	√	√	√	√	√	√	√	√	√		√	√		
3rd	50303302	**Pharmaceutical Technology I**	**C**	√	√	√	√	√	√	√	√	√	√	√		√	√		
	50303308	**Pharmaceutical Technology II**	**C**	√	√	√	√	√	√	√	√	√	√	√		√	√		
4th	50303403	**Biopharmaceutics**	**C**	√	√	√	√	√	√	√	√	√	√	√		√	√		
	50303409	**Industrial Pharmacy I**	**C**	√	√	√	√	√	√	√	√	√	√	√		√	√		

5th	50303503	**Industrial Pharmacy II**	**C**	√	√			√	√	√	√	√	√	√		√	√		
	50303508	**Dosage form**	**C**	√	√	√	√	√	√	√	√	√	√	√		√	√		
5th	50303507	**Pharmaceutical Biotechnology**	**C**	√	√	√	√	√	√	√	√	√	√	√		√	√		

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmer specification.

1. Teaching Institution	Al Mustansiriya University
2. University Department/Centre	College of Pharmacy
3. Course title/code	Principle of Pharmacy Practice
4. Programmer(s) to which it contributes	Part of BSc / Pharmacy
5. Modes of Attendance offered	Semesters
6. Semester/Year	1st/ first year
7. Number of hours tuition (total)	2hr/semester
8. Date of production/revision of this specification	19/05/2016
9. Aims of the Course	
Enable the students to interpretation of prescription or medication order, to use the metric and apothecaries system in pharmaceutical calculations to calculate the dose, to use some of fundamental of measurements and calculations and to use calculations related density, specific gravity and specific volume.	

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A. Knowledge and Understanding
A1. It teaches kinds of numbers, abbreviations that are commonly used in prescriptions and their meanings.
A2. In this course the students will understand the component of typical prescription, the different unit system and the relation between them.
A3. Students will also be able familiar with the method and tools of measuring weights and volumes.
A4. Students will also be able to calculate doses on different bases.
A5. Students will also be able to reduce and enlarge formulas.

B. Subject-specific skills
B1. Solving practice problems
B2 Writing scientific reports
B3. Homework

Teaching and Learning Methods

Lectures by using the smart board and white board

Assessment methods

1- Quizzes
2- Oral discussions
3- Mid-term exams
4- Final exam

C. Thinking Skills
C1. Discussions within groups .
C2. Presentations.

Teaching and Learning Methods

Lectures by using the smart board, white board and lab work

D. General and Transferable Skills (other skills relevant to employability and personaldevelopment) D1. Using online resources D2. Literature survey .

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	2	Fundamentals of pharmaceutical calculation	Common and Decimal Fractions, Percent Ratio, Proportion and practice problems.	Smart board, white board, handout	Discussions
2nd	2	Interpenetration of prescription and medical orders	Objectives, Hospital and Other Institutional Medication Order Forms and Use of Roman Numerals on Prescriptions	Smart board, white board, handout	Discussions
3rd	2	Interpenetration of prescription and medical orders	Use of Abbreviations and Symbols , Practice problems.	Smart board, white board, handout	Discussions
4th	2	International system of units	Objectives. Guidelines for the Correct Use of the SI, Measure of Volume, Measure of Weight	Smart board, white board, handout	Discussions
5th	2	International system of units	Fundamental Computations, Practice Problems	Smart board, white board, handout	
					Mid term Exam
6th	2	Common system of measurement and intersystem conversion	Apothecaries' Fluid Measure, Apothecaries' Measure of Weight, Avoirdupois Measure	Smart board, white board, handout	Discussions

			of Weight, Fundamental Operations and Calculations		
7th	2	Common system of measurement and intersystem conversion	Intersystem Conversion, Conversion of Liquid Quantities , Conversion of Weights ,Practice Problems	Smart board, white board, handout	Discussions
8th	2	Calculation of doses: General consideration	Objectives, Dose Definitions Dose Measurement. General Dose Calculations.	Smart board, white board, handout	Discussions
9th	2	Calculation of doses: General consideration	General Dose Calculations. Practice Problems	Smart board, white board, handout	Discussions
10th	2	Calculation of doses: Patient parameters	Objectives. Pediatric Patients Geriatric Patients Drug Dosage Based on Age.	Smart board, white board, handout	Discussions
11th	2	Calculation of doses: Patient parameters	Drug Dosage Based on Body Weigh, Drug Dosage Based on Body Surface Area, Practice Problems.	Smart board, white board, handout	Discussions
12th	2	Density, Specific Gravity, and Specific Volume	Objectives, Density. Specific Gravity Density Versus Specific Gravity, Calculating the Specific Gravity of Liquids.	Smart board, white board, handout	Discussions
13th	2	Density, Specific Gravity, and Specific	Use of Specific Gravity in Calculations of Weight and Volume	Smart board, white board,	Discussions

		Volume	Calculating Specific Volume, Practice Problems	handout	
14th	2	Reducing and enlarging formulas	Objectives, Formulas That Specify Proportional Parts	Smart board, white board, handout	
15th	2	Reducing and enlarging formulas	Practice Problems	Smart board, white board, handout	Discussions

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Pharmaceutical Calculations 13th Edition Howard C. Ansel,
Special requirements (include for example workshops, periodicals, IT software, websites)	

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al Mustansiriya University
2. University Department/Centre	College of Pharmacy
3. Course title/code	Pharmaceutical calculation
4. Programme (s) to which it contributes	Part of B.Sc. / Pharmacy
5. Modes of Attendance offered	Semesters
6. Semester/Year	2nd semester/ 1st year
7. Number of hours tuition (total)	2hr/semester
8. Date of production/revision of this specification	19/05/2016

9. Aims of the Course

The use of calculations in pharmacy is varied and broad-based. It encompasses calculations performed by pharmacists in traditional as well as in specialized practice settings and within operational and research areas in industry, academia, and government.
The scope of pharmaceutical calculations includes computations related to: Chemical and physical properties of drug substances and pharmaceutical ingredient; biological activity and rates of drug absorption, bodily distribution, metabolism and excretion; statistical data from basic research and clinical drug studies; pharmaceutical product development and formulation; prescriptions and medication orders including drug dosage, dosage regimens, and patient compliance; pharmacoeconomics; and other areas.

10· Learning Outcomes, Teaching , Learning and Assessment Methods

A-Knowledge and understanding:
A1-Be able to perform the calculations required to prepare isotonic and buffered solutions.
A2- Be able to convert between milligrams, milliequivalents, millimoles, and milliosmoles.
A3- Be able to perform calculations for adult and pediatric intravenous infusions.
A4- Be able to perform calculations for preparation of stock solutions; altering product strength.

B. Subject-specific skills
B1. Solving special problems
B2. Giving presentations on specific topics
B3. Writing scientific reports
B4. Small group assignments

Teaching and Learning Methods
Lectures by using the smart board, white board and lab work
Assessment methods
1- Quizzes 2- Oral discussions 3- Mid-term exams 4- Final exam
C. Thinking Skills C1. Discussions within small groups C2. Presentations C3. Small projects.
Teaching and Learning Methods
Lectures by using the smart board, white board and lab work
Assessment methods
1- Quizzes 2- Oral discussions 3- Mid-term exams 4- Final exam

D. General and Transferable Skills (other skills relevant to employability and personal development) D1. Using online resources D2. Literature survey .

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	2	Isotonic and buffer solutions	Differentiate between the terms isosmotic, isotonic, hypertonic and hypotonic.	Smart board, white board, handout	Discussions
2nd	2	Isotonic and buffer solutions	Apply physical chemical principles in the calculation of isotonic solutions.	Smart board, white board, handout	Discussions
3rd	2	Isotonic and buffer solutions	Perform the calculations required to prepare isotonic component prescription.	Smart board, white board, handout	Discussions
4th	2	Electrolyte solutions: Milliequivalents, millimoles, and milliosmoles	Calculate the milliequivalent weight from an atomic or formula weight.	Smart board, white board, handout	Discussions
					Midterm exam
5th	2	Electrolyte solutions: Milliequivalents, millimoles, and milliosmoles	Convert between milligrams and milliequivalents.	Smart board, white board, handout	Discussions
6th	2	Electrolyte solutions: Milliequivalents, millimoles, and milliosmoles	Calculate problems involvingmilliequivalents .	Smart board, white board, handout	Discussions
7th	2	Electrolyte solutions: Milliequivalents, millimoles, and milliosmoles	Calculate problems involvingmillimoles and milliosmoles.	Smart board, white board, handout	Discussions
8th	2	Altering product strength, use of stock solutions, and problem solving by alligation	Perform calculations for altering product strength by dilution.	Smart board, white board, handout	Discussions
9th	2	Altering product strength, use of stock solutions, and problem solving by alligation	Perform calculations for altering product strength by concentration.	Smart board, white board, handout	Discussions
10th	2	Altering product strength, use of	Perform calculations for preparation and use of	Smart board, white board, handout	Discussions

		stock solutions, and problem solving by alligation	stock solutions.		
					Quiz
11th	2	Altering product strength, use of stock solutions, and problem solving by alligation	Apply allegation medial and allegation alternate in problem- solving.	Smart board, white board, handout	Discussions
12th	2	Intravenous infusions, Parenteral admixtures, and rate of flow calculations	Perform calculations for adults and paediatric intravenous infusions.	Smart board, white board, handout and solve questions	Discussions
13th	2	Intravenous infusions, Parenteral admixtures, and rate of flow calculations	Perform calculations for intravenous additives.	Smart board, white board, handout	Discussions
14th	2	Intravenous infusions, Parenteral admixtures, and rate of flow calculations	Perform rate of flow calculations for intravenous fluids.	Smart board, white board, handout	Discussions
15th	2	Intravenous infusions, Parenteral admixtures, and rate of flow calculations	Utilize correctly rate of flow tables and nomograms.	Smart board, white board, handout	Discussions
					Final exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Ansel, “Pharmaceutical calculations”, Wolters Kluwer. , 2010.
Special requirements (include for example workshops, periodicals, IT software, websites)	Workshops

13. Admissions	
Pre-requisites	
Minimum number of students	
Maximum number of students	

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al Mustansiriya University
2. University Department/Centre	College of Pharmacy
3. Course title/code	Physical pharmacy I
4. Programme(s) to which it contributes	Part of B.Sc. / Pharmacy
5. Modes of Attendance offered	Semesters
6. Semester/Year	1st semester/ 2nd year
7. Number of hours tuition (total)	3hr theory, 2hr practical /semester
8. Date of production/revision of this specification	23/5/2016

9. Aims of the Course
To understand the application of quantitative and theoretical principles of the physical characters of matter in the practice of pharmacy

Learning Outcomes, Teaching ,Learning and Assessment Method
A- Knowledge and Understanding A1. Comprehensive acquaintance about States of Matter. A2. Comprehensive acquaintance about Thermodynamic. A3.Comprehensive knowledge about the Solutions of nonelectrolytes and electrolytes. A4. Comprehensive knowledge about ionic equlibria and buffer and isotonic solutions. .
B. Subject-specific skills B1. Solving special problems B2. Giving presentations on specific topics B3. Writing scientific reports B4. Small group assignments
Teaching and Learning Methods
Lectures by using the smart board, white board and lab work
Assessment methods
1- Quizzes 2- Oral discussions 3- Mid-term exams 4- Final exam
C. Thinking Skills C1. Discussions within small groups C2. Presentations C3. Small projects
D. General and Transferable Skills (other skills relevant to employability and personal development) D1. Using online resources D2. Literature survey .

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	3	States of Matter	Binding forces between molecules, Gas ,liquid and solid states	Smart board, white board, handout	Discussions
2nd	3	States of Matter	Phase equilibria and phase rule.	Smart board, white board, handout	Guiz
3rd	3	States of Matter	Thermal analysis	Smart board, white board, handout	Discussions
4th	3	Thermodynamic	Thermodynamic: First law	Smart board, white board, handout	Discussions
					Midterm exam
5th	3	Thermodynamic	Thermodynamic: Second law	Smart board, white board, handout	Discussions
6th	3	Thermodynamic	third law, free energy	Smart board, white board, handout	Discussions
7th	3	Solutions of nonelectrolytes	properties , ideal and real colligative properties	Smart board, white board, handout	Discussions

8th	3	Solutions of nonelectrolytes	Molecular weight determination	Smart board, white board, handout	Discussions
9th	3	solutions of elecrtrolytes	Properties	Smart board, white board, handout	Discussions
10th	3	solutions of elecrtrolytes	Arrehenius theory	Smart board, white board, handout	Discussions
11th	3	Solutions of electrolytes:	Ionic strength	Smart board, white board, handout	Discussions
12th	3	Solutions of electrolytes	Theory of debye-Huckel	Smart board, white board, handout	Discussions
13th	3	Ionic equlibria	Acid base theory, calculation of pH	Smart board, white board, handout	Discussions
14th	3	Ionic equlibria	The effect of ionic strength	Smart board, white board, handout	Discussions
15th	3	Ionic equlibria	Buffer and isotonic solutions, Buffer and biological systems	Smart board, white board, handout	Discussions
					Final Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Martin´s physical pharmacy and pharmaceutical sciences, Patrick J. Sinko .Wolters Kluwer. Lippincott Williams &Wilkins. Philadelphia. 2011.
Special requirements (include for example workshops, periodicals, IT software, websites)	

13. Admissions	
Pre-requisites	
Minimum number of students	
Maximum number of students	

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

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This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al Mustansiriya University
2. University Department/Centre	College of Pharmacy

3. Course title/code	Physical pharmacy II
4. Programme (s) to which it contributes	Part of BSc / Pharmacy
5. Modes of Attendance offered	Semesters
6. Semester/Year	2nd semester/ 2nd year
7. Number of hours tuition (total)	3hr theory , 2hr practical /semester
8. Date of production/revision of this specification	23/5/2016
9. Aims of the Course	
To understand the application of quantitative and theoretical principles of the physical characters of matter in the practice of pharmacy. It aids the pharmacist to predict the solubility, compatibility and the biological activity of drug products. 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	

Learning Outcomes, Teaching ,Learning and Assessment Method
A- Knowledge and Understanding A1. Comprehensive acquaintance about solubility and distribution phenomena A2. . Comprehensive acquaintance about rate and order of reactions, .influence of temperature and other factors on reaction rate. A3.Comprehensive knowledge about the rheology. A4. Comprehensive knowledge about interfacial phenomena and colloids.
B. Subject-specific skills B1. Solving special problems B2. Giving presentations on specific topics B3. Writing scientific reports B4. Small group assignments
Teaching and Learning Methods
Lectures by using the smart board, white board and lab work
Assessment methods
1- Quizzes 2- Oral discussions 3- Mid-term exams 4- Final exam

C. Thinking Skills
C1. Discussions within small groups
C2. Presentations
C3. Small projects .

Teaching and Learning Methods

Lectures by using the smart board, white board and lab work

D. General and Transferable Skills (other skills relevant to employability and personal development)
D1. Using online resources
D2. Literature survey
.

Assessment methods
1- Quizzes
2- Oral discussions
3- Mid-term exams
4- Final exam

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	3	Solubility and distribution phenomena	Solubility expression, Solvent –solute interactions, solubility of liquid in liquid	Smart board, white board, handout	Discussions
2nd	3	Solubility and distribution phenomena	Solubility of solids in liquids ,Calculation of solubility of weak electrolytes as influenced by pH	Smart board, white board, handout	Discussions
3rd	3	Solubility and distribution phenomena	Distribution of solutes between immiscible solvents	Smart board, white board, handout	Discussions
4th	3	Kinetics	Rate and order of reactions,	Smart board, white board, handout	Discussions
					Midterm exam
5th	3	Kinetics	Influence of temperature and other factors on reaction rate	Smart board, white board, handout	Discussions
6th	3	Kinetics	Decomposition of medicinal agents and accelerated stability analysis	Smart board, white board, handout	Discussions
7th	3	Rheology	Newtonian systems, thixotropy	Smart board, white board, handout	Discussions

8th	3	Rheology	Measurement, negative thixotropy	Smart board, white board, handout	Discussions
9th	3	Rheology	Determination of thixotropy.	Smart board, white board, handout	Discussions
10th	3	Interfacial phenomena	Liquid interfaces, surface free energy	Smart board, white board, handout	Discussions
11th	3	Interfacial phenomena	Measurement of interfacial tension, spreading coefficient	Smart board, white board, handout	Discussions
12th	3	Interfacial phenomena	Surface active agents and wetting phenomena	Smart board, white board, handout	Discussions
13th	3	Colloids	Dispersed systems and its pharmaceutical applications	Smart board, white board, handout	Discussions
14th	3	Colloids	Types of colloidal systems, kinetic properties	Smart board, white board, handout	Discussions
15th	3	Colloids	Optical properties and electrical properties	Smart board, white board, handout	Discussions
					Final Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Martin´s physical pharmacy and pharmaceutical sciences, Patrick J. Sinko. Wolters Kluwer. Lippincott Williams &Wilkins. Philadelphia. 2011.
Special requirements (include for example workshops, periodicals, IT software, websites)	

13. Admissions	
Pre-requisites	
Minimum number of students	
Maximum number of students	

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1. Teaching Institution	Al Mustansiriya University
2. University Department/Centre	College of Pharmacy
3. Course title/code	Pharmaceutical Technology
4. Programme(s) to which it contributes	Part of BSc / Pharmacy
5. Modes of Attendance offered	Semesters
6. Semester/Year	1st semester/ 3rd year
7. Number of hours tuition (total)	3hr/semester
8. Date of production/revision of this specification	19/05/2016
9. Aims of the Course	
To teach theoretical basis for the technology of preparing different dosage forms with respect to their raw materials, compositions, methods of preparations , stability and uses.	

10· Learning Outcomes, Teaching ,Learning and Assessment Method
A. knowledge and understanding: At the end of this course, the students will : A1-Be able to perform the calculations required to prepare any pharmaceutical dosage form. A2- Be able to identify different pharmaceutical dosage form. A3- Be able to prepare any pharmaceutical dosage form. A4- Be able to perform calculations for preparation of stock solutions; altering product strength.
B. Subject-specific skills B1. Solving special problems B2. Giving presentations on specific topics B3. Writing scientific reports B4. Small group assignments
Teaching and Learning Methods
Lectures by using the smart board, white board and lab work
Assessment methods
1- Quizzes 2- Oral discussions 3- Mid-term exams 4- Final exam

C. Thinking Skills
C1. Discussions within small groups
C2. Presentations
C3. Small projects.

Teaching and Learning Methods

Lectures by using the smart board, white board and lab work

Assessment methods

1- Quizzes
2- Oral discussions
3- Mid-term exams
4- Final exam

D. General and Transferable Skills (other skills relevant to employability and personaldevelopment)
D1. Using online resources
D2. Literature survey

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11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	3	Sol. & type of sol.	Definition of pharmaceutical solution dosage form and differentiation between their types.	Smart board, white board, handout	Discussions
2nd	3	Solubility and factors affecting solubility	differentiationbetween the solubility of pharmaceutical ingredients and factors affecting their solubility	Smart board, white board, handout	Discussions
3rd	3	Official solutions	Identification of Official solutions	Smart board, white board, handout	Discussions
4th	3	Aqueous solution &aromatic water	Differentiation between aqueous solutions.	Smart board, white board, handout	Discussions
					Midterm exam
5th	3	Syrups & sugar based syrups	Definition of pharmaceutical syrup dosage form and differentiation between .their type.	Smart board, white board, handout	Discussions
6th	3	clarification	Identification the methods of clarification and the equipment used for clarification	Smart board, white board, handout	Discussions
7th	3	Spirit	Identification the constituents of spirit dosage form and its methods of preparation.	Smart board, white board, handout	Discussions
8th	3	elixir	Identification the constituents of elixir dosage form and its methods of preparation.	Smart board, white board, handout	Discussions
9th	3	Extraction	Knowing the methods of extraction.	Smart board, white board, handout	Discussions
10th	3	maceration	Knowing the methods ofmaceration	Smart board, white board, handout	Discussions
					Quiz
11th	3	Tinctures	Identification the constituents of Tinctures dosage form and its methods of preparation.	Smart board, white board, handout	Discussions
12th	3	fluid extract	Identification the constituents of fluid	Smart board, white board,	Discussions

			extract dosage form and its methods of preparation.	handout and solve questions	
13th	3	Colloidal dispersion	Knowing the types of colloidal dispersion.	Smart board, white board, handout	Discussions
14th	3	Coarse dispersion	Knowing the types of Coarse dispersion	Smart board, white board, handout	Discussions
15th	3	suspension	Identification the constituents of suspension dosage form and its methods of preparation.	Smart board, white board, handout	Discussions
					Final exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1-Pharmaceutical dosage forms and drug delivery systems by Haward A. Ansel 2. Sprowels American pharmacy. 3-Aulton's Pharmaceutics: The Design and Manufacture of Medicines, 3rd ed. Michael E. Aulton (Author) Churchill
Special requirements (include for example workshops, periodicals, IT software, websites)	Workshops

13. Admissions	
Pre-requisites	
Minimum number of students	
Maximum number of students	

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al Mustansiriya University
2. University Department/Centre	College of Pharmacy
3. Course title/code	Pharmaceutical technology II
4. Programme(s) to which it contributes	Part of BSc / Pharmacy
5. Modes of Attendance offered	Semesters
6. Semester/Year	2nd semester /3rd year
7. Number of hours tuition (total)	3hr/semester
8. Date of production/revision of this specification	19/05/2016
9. Aims of the Course	
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	

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding

A1. Comprehensive acquaintance about principle of different drug dosage forms

A2. Methods of preparation of these dosage forms in small scale in laboratory and in pharmacy.

A3. 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

A4. In addition to define and characterize the possible incompatibilities that may occur in dosage forms.

B. Subject-specific skills

B1. Solving special problems

B2. Giving presentations on specific topics

B3. Writing scientific reports

B4. Small group assignments

Teaching and Learning Methods

Lectures by using the smart board, white board and lab work

Assessment methods

1- Quizzes
2- Oral discussions
3- Mid-term exams
4- Final exam

C. Thinking Skills

C1. Discussions within small groups

C2. Presentations

C3. Reports and home works

Teaching and Learning Methods

Lectures by using the smart board, white board and lab work

Assessment methods

1- Quizzes
2- Oral discussions
3- Mid-term exams
4- Final exam

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Using online resources
D2. Literature survey

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	3	Emulsion	purpose of emulsification; methods of emulsification.	Smart board, white board, handout	Discussions
2nd	3	Emulsion	emulsifying agents	Smart board, white board, handout	Discussions
3rd	3	Emulsion	Required HLB calculation ;Stability of emulsion: coalescence and breaking; flocculation and creaming	Smart board, white board, handout	Discussions
4th	3	Lotions; liniments and collodions	Types of lotion, liniment and collodion	Smart board, white board, handout	Discussions
					Midterm exam
5th	3	Suppository	Types of suppository bases	Smart board, white board, handout	Discussions
6th	3	Suppository	Preparation of suppositories	Smart board, white board, handout	Discussions
7th	3	Semisolid dosage forms	Ointments, creams and pastes	Smart board, white board, handout	Discussions
8th	3	Semisolid dosage forms	Types of ointment base	Smart board, white board, handout	Discussions
9th	3	Ophthalmic ointment	Ophthalmic ointment	Smart board, white board, handout	Discussions
10th	3	Powdered dosage forms	Methods of reduction and determination particle size	Smart board, white board, handout	Discussions
					Quiz
11th	3	Powdered dosage forms	Bulk and divided powders	Smart board, white board, handout	Discussions
12th	3	Powders and granules	Advantages of granules	Smart board, white board, handout and solve questions	Discussions
13th	3	Capsules	Hard and soft gelatin capsules	Smart board, white board, handout	Discussions
14th	3	Capsules	Problems of preparation of solid dosage forms	Smart board, white board, handout	Discussions
15th	3	Incompatibility	Physical, chemical and therapeutic	Smart board, white board,	Discussions

			incompatibility	handout	
					Final exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1. Ansel's pharmaceutical dosage forms and drug delivery 10th Edition by Loyd Allen (Author) 2. American pharmacy 3. Aulton's Pharmaceutics: The Design and Manufacture of Medicines, 3rd Edition Michael E. Aulton (Author). Churchill, Livingstone- Elsevier
Special requirements (include for example workshops, periodicals, IT software, websites)	Workshops

13. Admissions	
Pre-requisites	
Minimum number of students	
Maximum number of students	

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al Mustansiriya University
2. University Department/Centre	College of Pharmacy
3. Course title/code	Biopharmaceutics
4. Programme(s) to which it contributes	Part of BSc / Pharmacy
5. Modes of Attendance offered	Semesters
6. Semester/Year	1st semester/ 4th year
7. Number of hours tuition (total)	2hr/semester
8. Date of production/revision of this specification	19/05/2016
9. Aims of the Course	
The coarse 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. The pharmacokinetic part of the coarse deals with the time-coarse of the drug in the biological system, and quantification of drug concentration pattern in normal subjects and in certain disease states.	

10· Learning Outcomes, Teaching ,Learning and Assessment Methode
A. Knowledge and Understanding A1. Comprehensive acquaintance about principle of pharmacokinetics of drug, its absorption, distribution and elimination from body A2. bioavailability of the drug A3. Dissolution of drug A4. Estimation the shelf life of drug at room temperature
B. Subject-specific skills B1. Solving special problems B2. Giving presentations on specific topics B3. Writing scientific reports B4. Small group assignments
Teaching and Learning Methods
Lectures by using the smart board, white board and lab work

Assessment methods
1- Quizzes 2- Oral discussions 3- Mid-term exams 4- Final exam
C. Thinking Skills C1. Discussions within small groups C2. Presentations C3. Small projects .
Teaching and Learning Methods
Lectures by using the smart board, white board and lab work
Assessment methods
1- Quizzes 2- Oral discussions 3- Mid-term exams 4- Final exam
D. General and Transferable Skills (other skills relevant to employability and personal development) D1. Using online resources D2. Literature survey

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	2	Introduction to biopharmaceutics	Definition of biopharmaceutics, one and two compartment models	Smart board, white board, handout	Discussions
2nd	2	Biopharmaceutics aspects of products	Drug absorption; mechanisms of absorption	Smart board, white board, handout	Discussions
3rd	2	Factors affecting drug absorption	Passive diffusion, active transport and facilitated absorption	Smart board, white board, handout	Discussions
4th	2	Physicochemical factors	Dissolution rate; effects of excipients; type of dosage forms	Smart board, white board, handout	Discussions
					Midterm exam
5th	2	Physicochemical factors	Effect of particle size, type of excipients and type of dosage forms	Smart board, white board, handout	Discussions
6th	2	One compartment open model	One compartment model after oral and IV	Smart board, white board, handout	Discussions
7th	2	Multicompartment models	Two compartment model after oral and IV	Smart board, white board, handout	Discussions
8th	2	Pharmacokinetics of drug absorption.	Zero order drug absorption model and first order drug absorption model.	Smart board, white board, handout	Discussions
9th	2	Intravenous infusion;	Steady-State Drug Concentration (C_{ss}) and Time Needed to Reach C_{ss}, loading dose plus IV infusion.	Smart board, white board, handout	Discussions
10th	2	Multiple dosage regimen	Drug accumulation.	Smart board, white board, handout	Discussions
					Quiz
11th	2	Non-linear pharmacokinetics	Reasons for nonlinear pharmacokinetics,saturable enzymatic elimination process	Smart board, white board, handout	Discussions
12th	2	Bioavailability and bioequivalence	Relative and absolute bioavailability	Smart board, white board, handout and solve questions	Discussions
13th	2	Clearance of drugs	Renal drug excretion,	Smart board,	Discussions

		from the biological systems:	hepatic elimination	white board, handout	
14th	2	Protein binding of drugs	kinetics of protein binding	Smart board, white board, handout	Discussions
15th	2	Dosage adjustment	Dosage adjustment in renal diseases	Smart board, white board, handout	Discussions
					Final exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1. Shargel L., Yu AB., (5th Edition). Applied Biopharmaceutics and Pharmacokinetics 2. Aulton's Pharmaceutics: The Design and Manufacture of Medicines, 3rd Edition Michael E. Aulton (Author). Churchill, Livingstone- Elsevier
Special requirements (include for example workshops, periodicals, IT software, websites)	Workshops

13. Admissions	
Pre-requisites	
Minimum number of students	
Maximum number of students	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al Mustansiriya University
2. University Department/Centre	College of Pharmacy
3. Course title/code	Industrial pharmacy I
4. Programme(s) to which it contributes	Part of BSc / Pharmacy
5. Modes of Attendance offered	Semesters
6. Semester/Year	2nd semester/ 4th year
7. Number of hours tuition (total)	3hr/semester
8. Date of production/revision of this specification	10/05/2016
9. Aims of the Course	
The subjective aim of this course is to teach pharmacy students the steps and lines upon which the preformulation processing of pharmaceutical dosage forms. This fundamental course provides 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

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding

A1. Be able to know various principles of pharmaceutical processing, solid mixing, fluid mixing, mixing mechanisms and equipment.

A2. Be able to contrast between different types of mills and the milling application in pharmacy, in addition to size measurement of particles and the factors effecting milling them. Besides selection of milling techniques.

A3. Be able to describe drying and humidity measurement also classification of dryers and theories of drying.

A4. Have obtained hands-on experience in pharmaceutical requirements to obtain sterile products. Besides acknowledgement in development, production, processing and quality control.

A5. Provide different solutions for clarification and filtration of pharmaceutical products by knowing the required filter media filter aids and the sterile and sterile operations.

A6.Get benefit from having acknowledgment in sterilization mechanisms and evaluations to validate microbial death kinetics.

A7. Help students to start designing different pharmaceutical dosage forms through knowing preformulation, preliminary evaluation, bulk characterization, solubility and stability analysis

B. Subject-specific skills

B1. Solving practice problems

B2. Homework

B3. Writing scientific reports

B4. Small group assignments

Teaching and Learning Methods

Lectures by using the smart board, white board and lab work

Assessment methods

1- Quizzes
2- Oral discussions
3- Mid-term exams
4- Final exam

C. Thinking Skills
C1. Discussions within small groups
C2. Presentations
C3. Small projects .

Teaching and Learning Methods

Lectures by using the smart board, white board and lab work

Assessment methods

1- Quizzes
2- Oral discussions
3- Mid-term exam
4- Final exam

D. General and Transferable Skills (other skills relevant to employability and personal development)
D1. Using online resources
D2. Literature survey
.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	3	**Sterilization**	Describe different sterilization ways and equipments required.	Smart board, white board, handout	Quizzes, exams, discussions
2nd	3	**Preformulation part 1**	Steps required changing an active ingredient into suitable dosage form.	Smart board, white board, handout	Quizzes, exams, discussions
3rd	3	**Preformulation part 2**	Solubility and stability of active ingredient in its chosen dosage form.	Smart board, white board, handout	Quizzes, exams, discussions
4th	3	Clarification and Filtration part 1	Factors affecting filtration processes	Smart board, white board, handout	Quizzes, exams, discussions
5th	3	Clarification and Filtration part 1	Selection suitable filter media for suitable filtration process	Smart board, white board, handout	Quizzes, exams, discussions
6th	3	Milling part 1	Describe milling, size distribution and its measurement	Smart board, white board, handout	Quizzes, exams, discussions
7th	3	Milling part 2	Theory of milling, milling equipment, types of milling and mechanisms of size reduction	Smart board, white board, handout	Quizzes, exams, discussions
8th	3	Milling part 3	Factors influence milling and selection of mill	Smart board, white board, handout	Quizzes, exams, discussions
9th	3	Mixing part 1	Fluid mixing and their mechanisms and mixers selection.	Smart board, white board, handout	Quizzes, exams, discussions
10th	3	Mixing part 2	Solid mixing and their mixing	Smart board, white board, handout	Quizzes, exams, discussions
11th	3	Mixing part 3	Equipment mixing and mixer selection	Smart board, white board, handout	Quizzes, exams, discussions
12th	3	Drying part 1	Definition of drying, Purposes of drying, Psychrometry and Theory of drying	Smart board, white board, handout	Quizzes, exams, discussions
13th	3	Drying part 2	Behavior of solids during drying and classification of dryers	Smart board, white board, handout	Quizzes, exams, discussions
14th	3	Sterile product part 1	Product development, solvents, non-aq. Solvents and solutes	Smart board, white board, handout	Quizzes, exams, discussions

15th	3	Sterile product part 2	Containers, filling procedures and packaging	Smart board, white board, handout	Quizzes, exams, discussions

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Theory and practice in industrial pharmacy by Lachmann (2009)
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures , internship , field studies)	

13. Admissions	
Pre-requisites	
Minimum number of students	
Maximum number of students	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al Mustansiriya University
2. University Department/Centre	College of Pharmacy
3. Course title/code	Industrial pharmacy II
4. Programme(s) to which it contributes	Part of BSc / Pharmacy
5. Modes of Attendance offered	Semesters
6. Semester/Year	1st semester/ 5th year
7. Number of hours tuition (total)	3hr/semester
8. Date of production/revision of this specification	
9. Aims of the Course	
This course will cover different type of dosage forms and the ways for their	
manufacturing also the materials included in their production and the quality	
control for each one of these types.	

10· Learning Outcomes, Teaching ,Learning and Assessment Method
A- Knowledge and Understanding A1 Technical setup for coordination of standards for formulation of typical dosage forms. A2. The principles needed for mass production of different pharmaceutical dosage forms.
B. Subject-specific skills B1. Solving practice problems B2. Homework B3. Writing scientific reports B4. Small group assignments
Teaching and Learning Methods
Lectures by using the smart board, white board and lab work
Assessment methods
1- Quizzes 2- Oral discussions 3- Mid-term exams 4- Final exam
C. Thinking Skills C1. Discussions within small groups C2. Presentations C3. Small projects .
Teaching and Learning Methods
Lectures by using the smart board, white board and lab work
Assessment methods
1- Quizzes 2- Oral discussions 3- Mid-term exam 4- Final exam

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Using online resources

D2. Literature survey

.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	3	Tablets introduction	Definition of tablet, History of tablets, Advantages and disadvantages of tablets, Properties of ideal tablets, Types and classes of tablets.	Smart board, white board, handout	Quizzes, exams, discussions
2nd	3	tablet continue	Direct compression method for granulation, Dry granulation method, Wet granulation method.	Smart board, white board, handout	Quizzes, exams, discussions
3rd	3	Evaluation of tablets	Quality Control of Tablets (Pharmacopoeial tests: and Non-pharmacopoeial test: Hardness test, Fraiability test).	Smart board, white board, handout	Quizzes, exams, discussions
4th	3	Problems of tabletting	Instrumental tablet machine (Machines used in production of tablets, Components of tablet machine, Problems of tablet manufacturing)	Smart board, white board, handout	Quizzes, exams, discussions
5th	3	Tablet coating	Tablets Coating: Purposes of tablet coating, Basic apparatus for tablet coating, Components of tablet coating, Tablet Core properties.	Smart board, white board, handout	Quizzes, exams, discussions
6th	3	Quality control of tablets	Methods of evaluation of film coats, Sustained release coating, Enteric coating, New and recent techniques in tab. Coating.	Smart board, white board, handout	Quizzes, exams, discussions
7th	3	Hard gelatin capsule	Hard gelatin capsules: Definition of Hard gelatin capsules, Advantages and Disadvantages of	Smart board, white board, handout	Quizzes, exams, discussions

			HGC, Materials used for production of HGC		
8th	3	Evaluation of hard gelatin capsule	Finishing (Pan polishing, Cloth dusting, Brushing, Storage)Special Techniques	Smart board, white board, handout	Quizzes, exams, discussions
9th	3	Soft gelatin capsule	Definition of Soft gelatin capsules, Composition of SGC, Therapeutic application of soft gelatin capsules, Shapes of capsules	Smart board, white board, handout	Quizzes, exams, discussions
10th	3	Evaluation of soft gelatin capsule	Nature of Capsule shell (Bloom or gel strength, Viscosity, Iron content, Plasticizers and gelatin). The nature of capsule content.	Smart board, white board, handout	Quizzes, exams, discussions
11th	3	Microecapsulation	Definition of microencapsulation, Applications of microencapsulation, Fundementals	Smart board, white board, handout	Quizzes, exams, discussions
12th	3	Semisolid preparation-I	Properties of semisolid D.F., Types of conventional semisolid D.F, Routes of penetration, Other routes of skin penetration).	Smart board, white board, handout	Quizzes, exams, discussions
13th	3	Semisolid preparation-II	Factors in skin penetration, Formulation of Semisolid dosage forms, Ingredients used in preparation of semisolids	Smart board, white board, handout	Quizzes, exams, discussions
14th	3	Aerosols and its quality control	Introduction to Aerosols, Advantages of Aerosols, Components of Aerosols packages.	Smart board, white board, handout	Quizzes, exams, discussions
15th	3	Quality control of Aerosols	Stability test and quality control of aerosols.	Smart board, white board, handout	Quizzes, exams, discussions

12. Infrastructure	
Required reading: · CORE TEXTS: Theory and practice in industrial pharmacy by Lachmann (2009) · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures , internship , field studies)	

13. Admissions	
Pre-requisites	
Minimum number of students	
Maximum number of students	

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al Mustansiriya University
2. University Department/Centre	College of Pharmacy
3. Course title/code	Pharmaceutical biotechnology
4. Programme(s) to which it contributes	Part of BSc / Pharmacy
5. Modes of Attendance offered	2nd Semester
6. Semester/Year	2nd Semester/ 5th
7. Number of hours tuition (total)	1hr theory /semester
8. Date of production/revision of this specification	
9. Aims of the Course	
Give an introduction to biotechnology science and types and uses of biotechnology products. The course also shows methods of formulation of biotechnology product and route of administration protein product to body. In addition to studying the pharmacokinetics of peptides and proteins.	

Learning Outcomes, Teaching ,Learning and Assessment Method
A- Knowledge and Understanding A.1. knowledge about biotechnology products e.g. proteins A.2. Get information about basic principle of formulation and preparation of biotechnology products and biopharmaceutical drugs A.3. Be able to formulate therapeutic proteins A.4. Knowledge about freeze drying and excipients used during formulation of protein by this technique A.5. Get information about route of protein delivery; both traditional methods of administration and alternative routes
B. Subject-specific skills B1. Solving biotechnological preparation problems B2. Giving presentations on specific topics B3. Writing scientific reports B4. Small group assignments
Teaching and Learning Methods
Lectures by using the smart board, white board and lab work

Assessment methods
1- Quizzes 2- Oral discussions 3- Mid-term exams 4- Final exam
C. Thinking Skills C1. Discussions within small groups C2. Presentations C3. Small projects .
Teaching and Learning Methods
Lectures by using the smart board, white board and lab work
Assessment methods 1- Quizzes 2- Oral discussions 3- Mid-term exams 4- Final exam
D. General and Transferable Skills (other skills relevant to employability and personal development) D1. Using online resources D2. Literature survey

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	1hr	Introduction to Biotechnology	Biotechnology Molecular biotechnology Biopharmaceutical Drugs Pharmaceutical biotechnology Pharmaceutical Biotechnology Products	Smart board, white board, handout	Quizzes, exams, discussions
3	3 hr	Formulation of biotechnology product (biopharmaceutical consideration)-	Microbial consideration Microbial consideration-Sterility-pyrogen viral decontamination	Smart board, white board, handout	Quizzes, exams, discussions
7	3hr	Excipients of parenteral products-solubility enhancer-anti adsorption agents	components found in parenteral formulations of biotech product 1-Solubility enhancers 2-Anti-adsorption and anti-aggregation agents	Smart board, white board, handout	Quizzes, exams, discussions
8	1hr	Buffer components-preservatives-osmotic agents	-Buffer components Preservatives and Anti-oxidants Osmotic Agents Freeze-Drying of Proteins Importance of Freeze Drying ,Typical excipients in a freeze-dried protein formulation	Smart board, white board, handout	Quizzes, exams, discussions
9	1hr	Delivery of protein, route of administration	The parenteral Route of Administration The Oral Route of Administration	Smart board, white board, handout	Quizzes, exams, discussions
10	1hr	The potential pros and cons for different relevant routes Approaches to enhance bioavailability of proteins	Protein delivery: Alternative route of proteins administration	Smart board, white board, handout	Quizzes, exams, discussions
11	1 hr	Pharmacokinetics of protein therapeutics Absorption of protein therapeutics, Strategies to overcome the obstacles associated with oral delivery of proteins IV versus SC	Pharmacokinetics and Pharmacodynamics of Peptide and Protein Drugs	Smart board, white board, handout	Quizzes, exams, discussions

12	1hr	Distribution Mechanisms and Volumes Pharmacokinetics of proteins Therapeutics Distribution via Receptor-Mediated Uptake	Distribution of protein therapeutics	Smart board, white board, handout	Quizzes, exams, discussions
13	1hr	Gastrointestinal Protein Metabolism	Elimination of Protein Therapeutics Proteolysis	Smart board, white board, handout	Quizzes, exams, discussions
14	1hr	glomerular filtration, Tubular absorption and Postglomerular peritubular	Renal Protein Metabolism and Excretion	Smart board, white board, handout	Quizzes, exams, discussions
15	1hr	Receptor-mediated endocytosis Direct shuttle or transcytotic pathway And Receptor-Mediated Protein Metabolism	Hepatic Protein Metabolism	Smart board, white board, handout	Quizzes, exams, discussions

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1. Pharmaceutical biotechnology by J.A. Crommelin, Robert D. Syinder. 2. Aulton's Pharmaceutics: The Design and Manufacture of Medicines, 3rd Edition Michael E. Aulton (Author). Churchill, Livingstone- Elsevier
Special requirements (include for example workshops, periodicals, IT software, websites)	Workshops

13. Admissions	
Pre-requisites	
Minimum number of students	
Maximum number of students	

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al Mustansiriya University
2. University Department/Centre	College of Pharmacy
3. Course title/code	Dosage form design
4. Programme(s) to which it contributes	Part of BSc / Pharmacy
5. Modes of Attendance offered	Semesters
6. Semester/Year	2nd semester/ 5th year
7. Number of hours tuition (total)	2hr/semester
8. Date of production/revision of this specification	19/05/2016
9. Aims of the Course	
The coarse deals with the principles and factors that influence design dosage form; and the applications of these principles in the practice of pharmaceutical industry.	

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Knowledge and Understanding

A1. Comprehensive acquaintance about History of pharmacy, and Standards books and pharmacopeias
A2. New Drug Development and Approval Process.
A3. Current Good Manufacturing Practices and Current Good Compounding Practices
A4. Pharmaceutical and Formulation considerations.
A5. Biopharmaceutical and Pharmacokinetic Considerations

B. Subject-specific skills
B1. Solving special problems
B2. Giving presentations on specific topics
B3. Writing scientific reports
B4. Small group assignments

Teaching and Learning Methods

Lectures by using the smart board, white board

Assessment methods

1- Quizzes
2- Oral discussions
3- Mid-term exams
4- Final exam

C. Thinking Skills
C1. Discussions within small groups
C2. Presentations
C3. Small projects .

D. General and Transferable Skills (other skills relevant to employability and personal development)
D1. Using online resources
D2. Literature survey

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	2	Introduction to drugs and pharmacy	The development and purpose of the United State Pharmacopeia (USP) and the National Formulary (NF),	Smart board, white board, handout	Discussions
2nd	2	Drug regulation and control	Significant drug regulation and control laws and their impact on pharmacy	Smart board, white board, handout	Discussions
3rd	2	New drug development and approval process	Investigational New Drug (IND) Application from a New Drug Application (NDA)	Smart board, white board, handout	Quizzes,
4th	2	FDA's Definition of a New Drug	Give examples of the sources of new drug	Smart board, white board, handout	Discussions
					Midterm exam
5th	2	Current good manufacturing practice	the Current Good Manufacturing Practice (cGMP) for finished pharmaceuticals	Smart board, white board, handout	Discussions
6th	2	Current good compounding practice	extemporaneous compounding	Smart board, white board, handout	Discussions
7th	2	Dosage form Design: Pharmaceutical consideration	The need for the dosage form; preformulation; physical description, microscopic examination	Smart board, white board, handout	Discussions
8th	2	Pharmaceutical consideration	Melting point; phase rule; particle size; polymorphism.	Smart board, white board, handout	Discussions
9th	2	Pharmaceutical consideration	Permeability; pH; partition coefficient; pka; stability; kinetics; shelf life; rate reaction; enhancing stability	Smart board, white board, handout	Discussions
10th	2	Formulation consideration:	Excipients definition and typed; Appearance; palatability;	Smart board, white board, handout	Discussions
11th	2	Formulation consideration	Flavoring; sweetening; coloring pharmaceuticals; preservatives; sterilization;	Smart board, white board, handout	Discussions

			preservatives selection.		
12th	2	Biopharmaceutical consideration	Principle of drug absorption;	Smart board, white board, handout	Discussions
13th	2	Biopharmaceutical consideration	Dissolution of drugs.	Smart board, white board, handout	Discussions
14th	2	Pharmacokinetic considerations	Bioavailability and bioequivalence; FDA requirements, Assessment of bioavailability; bioequivalence among drug products.	Smart board, white board, handout	Discussions
15th	2	Pharmacokinetic considerations	Pharmacokinetic principles: half life; clearance; dosage regimen considerations.	Smart board, white board, handout	Quiz
					Final Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Ansel's pharmaceutical dosage forms and drug delivery 10th Edition by Loyd Allen (Author) 2011
Special requirements (include for example workshops, periodicals, IT software, websites)	

13. Admissions	
Pre-requisites	
Minimum number of students	
Maximum number of students	