

Philadelphia University	 PHILADELPHIA UNIVERSITY <small>THE WAY TO THE FUTURE</small>	Approved Date: 11/10/2021
Faculty: Pharmacy		Issue: 2
Department: -		Credit Hours: 3
Academic Year:2021/2022		Course Syllabus

Course Information

Course No.	Course Title	Prerequisite	
0520420	Industrial Pharmacy	Pharmaceutics (II) (0520322)	
Course Type		Class Time	Room No.
<input type="checkbox"/> University Requirement	<input type="checkbox"/> Faculty Requirement	12:45-14:15 Sun, Tue	5507
<input type="checkbox"/> Major Requirement	<input type="checkbox"/> Elective <input checked="" type="checkbox"/> Compulsory	09:45-11:15 Mon, Wed	5611

Instructure Information

Name	Office No.	Phone No.	Office Hours	E-mail
Dr Mohammad Bayan	5532	+9622637444 Ext.: 2227	9:30-11:00 Sun, Tue 12:30-13:30 Mon, Wed	mbayan@philadelphia.edu.jo

Course Delivery Method

<input type="checkbox"/> Blended	<input type="checkbox"/> Online	<input checked="" type="checkbox"/> Physical
Learning Model		
Percentage	Synchronous	Asynchronous
	0	0
		100%

Course Description

This course will introduce the student to the basic concepts of particle sizing, its importance in pharmaceutical technology and methods used to either achieve that or measure it. Pharmaceutical industrial processes will be discussed in some details like drying, mixing, filtration and powder fluidity. The student will apply the knowledge to the pharmaceutical technology methods used in formulating and pre-formulating several dosage forms.

Course Learning Outcomes

Number	Outcome	Corresponding Program Outcomes	Corresponding Competencies
Knowledge			
K1	Understand pharmaceutical operations in industrial pharmacy regarding unit operations including particle size reduction, mixing, drying and filtration/centrifugation.	K _P 1, K _P 6	C1, C6
K2	Understand the basis of powder flow, its characterization and relation to the manufacture of solid dosage forms.	K _P 1, K _P 6	C1, C6
K3	Gain knowledge related to the concept of particle size, particle size measurement and its relevance to the drug manufacture and performance.	K _P 1, K _P 6	C1, C6
K4	Describe pharmaceutical equipment and apparatus used in the pharmaceutical production and problems rising with their use.	K _P 1, K _P 6	C1, C6
Skills			
S1	Differentiate between, and accordingly choose, techniques and machines used to achieve specific steps in pharmaceutical formulation.	S _P 2, S _P 9	C8, C15
S2	Identify and solve problems arising from performing certain unit operations.	S _P 2	C8
S3	Compare between different methods used to evaluate powder flowability to select suitable methods for specific situations.	S _P 2, S _P 9	C8, C15
S4	Perform calculation and data analysis related to particle size analysis and powder flow assessment.	S _P 2	C8

Learning Resources

Course Textbook	Aulton's Pharmaceutics: The Design and Manufacture of Medicines, Edit.: Michael E. Aulton and Kevin M. G. Taylor. Pub.: Churchill Livingstone, 4nd edition, 2013. ISBN: 978-0- 7020-4290-4
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Supporting References	<p>1. Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems (Paperback) by Loyd V., Jr. Allen, Nicholas G. Popovich, Howard C. Ansel, Loyd V. Allen, Publisher: Lippincott Williams & Wilkins; 8th edition (August 3, 2004) ISBN: 0781746124</p> <p>2. Modern Pharmaceutics by Gilbert S. Banker (Editor), Christopher T. Rhodes (Editor) 4th edition (June 15, 2002), Marcel Dekker; ISBN: 0824706749</p> <p>3. Merck Index: An Encyclopedia of Chemicals, Drugs, & Biologicals by Merck, Co, Maryadele J. Oneil (Editor), Ann Smith (Editor) 13th edition (October 2001), Merck & Co; ISBN: 0911910131</p> <p>4. The Theory and Practice of Industrial Pharmacy by Leon Lachman, Herbert A. Lieberman, Joseph L. Kanig. 3rd edition (August 1986), Lea & Febiger; ISBN: 0812109775</p> <p>5. Physical Pharmacy: Physical Chemical Principles in the Pharmaceutical Sciences by Alfred Martin, Pilar Bustamante, A.H.C. Chun (Illustrator) 622 pages 4th edition (January 15, 1993), Lea & Febiger; ISBN: 0812114388</p> <p>6. Handbook of Pharmaceutical Excipients by Arthur H. Kibbe (Editor), Ainley Wade, Paul J. Weller 665 pages 3rd edition Vol 3 (January 15, 2000), Amer. Pharmaceutical Assoc.; ISBN: 091733096X</p> <p>7. Remington: The Science and Practice of Pharmacy by David B. Troy (Editor), Publisher: Lippincott Williams & Wilkins; 21st edition (May 28, 2005) ISBN: 0781746736</p>
Supporting Websites	http://library.philadelphia.edu.jo/st_en.htm
Teaching Environment	<input checked="" type="checkbox"/> Classroom <input type="checkbox"/> laboratory <input type="checkbox"/> Learning Platform <input type="checkbox"/> Other

Meetings and Subjects Timetable

Week	Topic	Learning Method*	Task	Learning Material
1	Course Syllabus Particle size analysis: Importance. Equivalent diameters. Particle size distribution.	Lecture Flipped learning		Course Syllabus Textbook, part 2, Chapter 8
2	Statistics related to particle size. Methods of particle size analysis.	Lecture Problem solving based learning	Short report	Textbook, part 2, Chapter 9
3	Size reduction: Objectives. Influence of material properties. Energy requirements. Effect of size reduction on size distribution.	Lecture		Textbook, part 2, Chapter 10
4	Methods of size reduction.	Lecture Collaborative learning	Case study	Textbook, part 2, Chapter 10
5	Mixing: Importance. Definition and objectives. Types of mixtures. Mixing process and its mathematical treatment. Evaluation of degree of mixing.	Lecture		
6	Mechanisms of mixing. Powder segregation Ordered mixing.	Lecture		Textbook, part 2, Chapter 11
7	Equipments of powder mixing. Equipments of liquids mixing. Equipments of semisolids mixing.	Lecture Problem solving based learning	Homework	
8	Powder flow: Measurement of adhesion and cohesion. Particle properties and bulk flow.	Lecture		Textbook, part 2, Chapter 12
9	Packing geometry. Flow through an orifice. Mass and funnel flow.	Lecture		
10	Characterization of Powder Flow. Improvement of Powder Flow.	Lecture Collaborative learning	Case study	
11	Midterm Exam Drying: Moisture content of wet solids. Loss of water from wet solids.	Lecture		Textbook, part 5, Chapter 29
12	Types of drying methods Rate of drying in fixed beds.	Lecture		
13	Convective drying. Conductive drying.	Lecture		

	Radiation drying.			
14	Dryers for dilute solutions and suspensions. Freeze drying. Solute migration during drying.	Lecture Project based learning	Short presentation	
15	Clarification: Filtration. Centrifugation.	Lecture		Textbook, part 5, Chapter 25
16	Final Exam Week			

*Includes: lecture, flipped Class, project-based learning, problem solving based learning, collaboration learning

Course Contributing to Learner Skill Development

Using Technology
<ul style="list-style-type: none"> • Represent data in tabular and graphical manners. • Perform good analysis for the represented data and calculate related statistical values. • Come out with the best interpretation and understanding of machinery-produced data and graph sheets. • Be able to search and extract relevant information from literature.
Communication Skills
<ul style="list-style-type: none"> • Be able to represent and explain various issues related to the pharmaceutical operations in industrial manufacture of drug products. • Demonstrate ability to prepare relevant reports in a clear systematic way. • Be able to adapt and accommodate team working. • Access resources related to the description and application of the methods used for various unit operations.
Application of Concept Learnt
<ul style="list-style-type: none"> • Application of preformulation considerations during the development of solid dosage forms in the corresponding practical course.

Assessment Methods and Grade Distribution

Assessment Methods	Grade	Assessment Time (Week No.)	Course Outcomes to be Assessed
Mid Term Exam	% 30	11th week	K1, K3, K4, S1, S2, S4
Term Works*	% 30	Continuous	S1-S4
Final Exam	% 40	16th week	K1-K4 S1- S4
Total	%100		

* Include: quizzes, in-class and out of class assignment, presentations, reports, videotaped assignment, group, or individual project.

Alignment of Course Outcomes with Learning and Assessment Methods

Number	Learning Outcomes	Corresponding Competencies	Learning Method*	Assessment Method**
Knowledge				
K1	Understand pharmaceutical operations in industrial pharmacy regarding unit operations including particle size reduction, mixing, drying and filtration/centrifugation	C1, C6	Lecture Problem solving based learning	Exam/Quiz questions in-class and out of class assignments

K2	Understand the basis of powder flow, its characterization and relation to the manufacture of solid dosage forms.	C1, C6	Lecture Project based learning	Exam/Quiz questions Case study
K3	Gain knowledge related to the concept of particle size, particle size measurement and its relevance to the drug manufacture and performance.	C1, C6	Lecture Problem solving based learning	Exam/Quiz questions Short report
K4	Describe pharmaceutical equipment and apparatus used in the pharmaceutical production and problems rising with their use.	C1, C6	Lecture Collaborative learning	Exam/Quiz questions Case study
Skills				
S1	Differentiate between, and accordingly choose, techniques and machines used to achieve specific steps in pharmaceutical formulation.	C8, C15	Problem solving based learning Project-based learning Flipped learning	Exam/Quiz questions Presentation videotaped assignments
S2	Identify and solve problems arising from performing certain unit operations.	C8	Problem solving based learning Project based learning	Exam/Quiz questions in-class and out of class assignments
S3	Compare between different methods used to evaluate powder flowability to select suitable methods for specific situations.	C8, C15	Problem solving based learning Collaborative learning	Exam/Quiz questions Case study
S4	Perform calculation and data analysis related to particle size analysis and powder flow assessment.	C8	Problem solving based learning	Exam/Quiz questions in-class and out of class assignments

*Include: lecture, flipped class, project-based learning, problem solving based learning, collaboration learning.

** Include: quizzes, in-class and out of class assignments, presentations, reports, videotaped assignments, group or individual projects.

Course Polices

Policy	Policy Requirements
Passing Grade	The minimum pass for the course is (50%) and the minimum final mark is (35%).
Missing Exams	<ul style="list-style-type: none"> • Anyone absent from a declared semester exam without a sick or compulsive excuse accepted by the dean of the college that proposes the course, a zero mark shall be placed on that exam and calculated in his final mark. • Anyone absent from a declared semester exam with a sick or

	<p>compulsive excuse accepted by the dean of the college that proposes the course must submit proof of his excuse within a week from the date of the excuse's disappearance, and in this case, the subject teacher must hold a compensation exam for the student.</p> <ul style="list-style-type: none"> • Anyone absent from a final exam with a sick excuse or a compulsive excuse accepted by the dean of the college that proposes the material must submit proof of his excuse within three days from the date of holding that exam.
Attendance	<p>The student is not allowed to be absent more than (15%) of the total hours prescribed for the course, which equates to six lecture days (n t) and seven lectures (days). If the student misses more than (15%) of the total hours prescribed for the course without a satisfactory or compulsive excuse accepted by the dean of the faculty, he is prohibited from taking the final exam and his result in that subject is considered (zero), but if the absence is due to illness or a compulsive excuse accepted by the dean of the college that The article is introduced, it is considered withdrawn from that article, and the provisions of withdrawal shall apply to it.</p>
Academic Integrity	<p>Philadelphia University pays special attention to the issue of academic integrity, and the penalties stipulated in the university's instructions are applied to those who are proven to have committed an act that violates academic integrity, such as cheating, plagiarism (academic theft), collusion, intellectual property rights.</p>

Program Learning Outcomes to be Assessed in this Course

Number	Learning Outcome	Course Title	Assessment Method	Targeted Performance level

Description of Program learning Outcomes Assessment Method

Number	Detailed Description of Assessment

Assessment Rubric of the Program Learning Outcomes

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