Jordan University of Science and Technology
Faculty of Pharmacy
Pharmacy Department

PHAR451 Pharmaceutical Technology - JNQF Level: 6

First Semester 2024-2025

Course Catalog
3 Credit Hours. This course covers unit operations used in manufacturing pharmaceutical dosage forms. It also covers manufacturing of sterile dosage forms, microencapsulation and quality management.
Teaching Method: On Campus

Text Book	
Title	Lachman/ Lieberman's The Theory and Practice of Industrial Pharmacy
Author(s)	R K Khar; S P Vyas; Farhan J Ahmed; Gauravk Jalin
Edition	4th Edition
Short Name	Industrial pharmacy
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Dosage forms	Pharmaceutical Dosage Forms and Drug Delivery Systems	Loyd V., Allen Ed	11th Edition	
Handouts	Handouts	various sources and articles	1st Edition	

Instructor	
Name	**Prof. Mutaz Sheikh Salem**
Office Location	P2 L1
Office Hours	
Email	salem@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Sun, Tue, Thu : 11:30 - 12:30 Room: SOUTH HALL Section 2: Lecture Time: Mon, Wed : 10:00 - 11:30 Room: PH2104

Prerequisites		
Line Number	**Course Name**	**Prerequisite Type**
303544	PHAR354 Pharmaceutics 3	Prerequisite / Study

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Week 1	Unit operations: Introduction	From **Industrial pharmacy**
Weeks 1, 2	Mixing	From **Industrial pharmacy**
Weeks 2, 3	Size reduction and milling From	From **Industrial pharmacy**
Weeks 3, 4	Drying	From **Industrial pharmacy**
Weeks 5, 6	Compression and consolidation	From **Industrial pharmacy**

Weeks 7, 8, 9, 10, 11, 12	Sterile dosage forms: Introduction, Factors affecting formulation of drugs into sterile preparations, Substances used in sterile dosage forms, Sterilization and validation of sterility, Parenteral packaging systems, Pyrogen and pyrogen testing, Manufacturing of sterile products.	From **Industrial pharmacy**, From **Dosage forms**, From **Handouts**
Weeks 13, 14	Microencapsulation	From **Industrial pharmacy**
Weeks 15, 16	Quality management: Quality assurance, GMP for pharmaceutical products, Good practices in production, Good practices in quality control.	From **Handouts**

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Select the suitable mixing technique or method for a pharmaceutical process to obtain acceptable homogenous product [1PLO1.1] [1L6K1]	8%	First Exam - include 5 points active learning component, Final Exam
Select the suitable milling method for a pharmaceutical solid to obtain a product with acceptable charateristics such as particle size and distribution [1PLO2.1] [1L6K1]	9%	First Exam - include 5 points active learning component, Final Exam
Select the suitable drying or evaporation method for pharmaceutical system to obtain a product with optimum characteristics such as moisture content, stability and cake structure. [[1PLO2.1] [1L6K1]	11%	First Exam - include 5 points active learning component, Final Exam
Solve the problems associated with process of solid dosage forms fabrication to obtain compact or granules with optimum characteristics [1PLO3.1, 1PLO5.1] [1L6S1]	17%	First Exam - include 5 points active learning component, Second Exam, Final Exam
Produce (formulate, manufacture, control and quality assurance) sterile dosage form (Parenteral products). [1PLO5.1] [1L6S3]	30%	Second Exam, Final Exam
Select the suitable material(s) and technique for the microencapsulation of a pharmaceutical material to obtain a product with desirable characteristics [1PLO4.3] [1L6C4]	16%	Final Exam
Apply quality management principles in the manufacture of pharmaceutical materials or products [1PLO5.1] [1L6C1]	9%	Final Exam

PLO1.1	PLO2.1	PLO3.2	PLO3.3	PLO2.2	PLO2.3	PLO2.4	PLO3.1	PLO3.4	PLO3.5	PLO3.6	PLO4.1	PLO4.2	PLO4.3	PLO4.4	PLO5.1	PLO-PT1.1	PLO-PT2.1	PLO-PT2.2	PLO-PT3.1
8	20						8.5						16		47.5				

Relationship to NQF Outcomes (Out of 100%)				
L6K1	L6S1	L6S3	L6C1	L6C4
28	17	30	9	16

Evaluation	
Assessment Tool	**Weight**
First Exam - include 5 points active learning component	30%
Second Exam	30%
Final Exam	40%

Policy	
Teaching and Learning Methods	The course will be presented as follow: 1. Handout will be distributed about the materials to be presented. Bring the handout to the class and write notes on the handout as the material is presented. 2. At home read the Handout and the textbook to obtain better understanding for the topic. 3. Reading the handout only before exam will not be sufficient to understand the material properly. 4. You are responsible for all material covered in the class and assigned textbook. 5. Project will be announced later in the class
Additional Notes	Exams: The format for the exams is generally (but NOT always) as follows: short essay questions and some multiple choice questions. Makeup Exams: Make up exam should not be given unless there is a real valid excuse, No make ups for quizzes Cheating: The commitment of the acts of cheating and deceit such as copying during examinations, altering examinations for re-grade, plagiarism of homework assignments, and in any way representing the work of others as your own is dishonest and will not be tolerated. Standard JUST policy will be applied بالغش فتوقع عل?? العقوبات التال?ة: مجتمعة المادة :7 إذا،ضبط الطالب أثناء الامتحان أو الاختبار متلبساً: في ذلك الامتحان أو الاختبار اعتباره راسباً الغاء تسج?ل? في بق?ة المساقات المسجل ل?ا في ذلك الفصل ??فصل? من الجامعة لمدة فصل دراسي واحد، و ?و الفصل التالي للفصل الذي ضبط ف Attendance: Excellent attendance is expected. - JUST policy requires the faculty member to assign ZERO grade (35) if a student misses 10% of the classes that are not excused. - If you miss class, it is your responsibility to find out about any announcements or assignments you may have missed. Workload: Student on average is expected to spend 6 hours/week

Course Competencies	1.1 Learner (Learner): Develop, integrate, and apply knowledge from the foundational sciences (i.e., pharmaceutical, social/behavioral/administrative, and clinical sciences) to evaluate the scientific literature, explain drug action, solve therapeutic problems, and advance population health and patient-centered care. 3.1 Problem Solving (Problem Solver): Identify problems; explore and prioritize potential strategies; and design, implement, and evaluate a viable solution. 5.1 Manufacturer: Carries out compounding procedures to produce an effective and safe medicine (compounder) and implements quality control measures and tests (Quality Manager) in accordance with regulations
Course Aims and Objectives	The aim of this course is to provide the student with technologies relevant to the production of pharmaceuticals and provide the means necessary to solve some manufacturing development issues. Quality systems relevant to manufacturing of pharmaceutical product are also discussed. Special emphasis have been given to the technology and means to produce parenteral products.
Objectives and weights	1. Familiarize students with unit operations used in the manufacturing of pharmaceutical dosage forms. Emphases will be placed on mixing, milling, drying, compression and consolidation. 40% 2. Familiarize students with manufacturing of parenteral preparations. Emphases will be placed on compounding, quality control and quality assurance requirements. 30% 3. Familiarize students with microencapsulation process 15% 4. Familiarize students with quality management, quality assurance and GMP requirements for pharmaceutical manufacturing. 15%

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