

Course Description (Drug Delivery Systems)

Performance review of higher education institution (assessment of the academic program)

This course description summarizes the key characteristics and anticipated learning objectives for students, assessing their utilization of available learning resources, and must be aligned with the program description.

1. Educational Institution	Al-Zahrawi University
2. University Department / Center	College of Pharmacy
3. Course Name / Code	Drug Delivery Systems
4. Programs in which it is included	Bachelor of Pharmacy
5. Available Forms of Attendance	Daily Attendance
6. Semester / Year	Second Semester, Fifth Stage (2025-2026)
7. Total Number of Study Hours	2 hours per week for each group
8. Date of preparing this description	2025-2026
9. Course Objectives: 1) Explain the process of new drug development, including drug discovery, preclinical evaluation, early formulation studies, and regulatory submission of INDs, NDAs, and ICH guidelines. 2) Explore the principles and applications of pharmaceutical nanotechnology, including the design and use of liposomes, dendrimers, micelles, solid nanoparticles, and lipid-based delivery systems in modern therapeutics. 3) Describe the anatomical and physiological considerations for non-oral routes of drug delivery, including nasal, ocular, transdermal, and pulmonary routes. 4) Analyze formulation challenges and strategies for improving drug solubility, permeability, bioavailability, and patient adherence across various advanced delivery systems. 5) Evaluate the design, function, and clinical considerations of innovative delivery platforms such as patches, inhalers, eye drops, and nanoparticle-based systems.	
1. Learning Outcomes, Teaching and Learning Methods, and Evaluation	

A. Knowledge and Understanding

- A.1: Understanding the process of drug discovery and approval.
- A.2: Understanding different formulations for drug delivery and targeting for different diseases.
- A.3: Understanding the effect of drugs physicochemical properties on formulations choices.

B. Subject-Specific Skills

- B.1: Enable students to choose different drug formulations for specific diseases.
- B.2: Enable students to advance their careers as pharmaceutical scientists.

Teaching and Learning Methods

- 1. Lectures.
- 2. Teamwork.
- 3. Quizzes and exams.

C. Evaluation Methods

- 1. Quizzes, mid-term, and final exams.
- 2. Seminars and posters.

D. Thinking Skills

- D1. Encourage students to think correctly through analysis of principles of drug formulations.
- D2. Enable students to correctly handle drug formulations for proper use.

E. General and Transferable Skills

- D1. Encourage students to do research articles.
- D 2. Encourage students to discuss scientific report.
- D 3. Learn skills necessary to handle formulations.
- D 4. Learn leadership skills.

11. Course Structure					
Weeks	Hours	Required Learning Outcomes	Unit Name / Course or Topic	Learning Methods	Evaluation Method
1	2	Knowledge	New Drug Development and Approval Process	Smart screen	Exams and oral questions
2	2	Knowledge	New Drug Development and Approval Process	Smart screen	Exams and oral questions
3	2	Knowledge	New Drug Development and Approval Process	Smart screen	Exams and oral questions
4	2	Knowledge	Pharmaceutical Nanotechnology and Nanomedicines	Smart screen	Exams and oral questions
5	2	Knowledge	Pharmaceutical Nanotechnology and Nanomedicines	Smart screen	Exams and oral questions
6	2	Knowledge	Pharmaceutical Nanotechnology and Nanomedicines	Smart screen	Exams and oral questions
7	2	Knowledge	Nasal Drug Delivery	Smart screen	Exams and oral questions
8	2	Knowledge	Nasal Drug Delivery	Smart screen	Exams and oral questions
9	2	Knowledge	Ocular Drug Delivery	Smart screen	Exams and oral questions
10	2	Knowledge	Ocular Drug Delivery	Smart screen	Exams and oral questions
11	2	Knowledge	Transdermals and Transdermal Drug Delivery Systems	Smart screen	Exams and oral questions
12	2	Knowledge	Transdermals and Transdermal Drug Delivery Systems	Smart screen	Exams and oral questions

13	2	Knowledge	Pulmonary Drug Delivery	Smart screen	Exams and oral questions
14	2	Knowledge	Pulmonary Drug Delivery	Smart screen	Exams and oral questions

12. Infrastructure	
Required Readings:	References: Pharmaceutical Dosage Forms and Drug Delivery Systems by Howard A. Ansel; 11th edition, 2017. Aulton's Pharmaceutics; The Design and Manufacture of Medicines; 6th edition, 2022.
Special Requirements (Workshops, Journals, Software, Websites):	Electronic Websites: None
Social Services (Guest Lectures, Professional Training, Field Studies, Others)	Organizing workshops and courses for graduates: None

13. Admission:	
Prerequisites	Admission according to the central plan
Minimum Number of Students	
Maximum Number of Students	

Name of the Instructor: Ammar Sahib Abdulameer, Ph.D.