The University of Jordan

Accreditation & Quality Assurance Center

COURSE Syllabus

1	Course title	Selected Topics in Pharmaceutical Technology
2	Course number	1202538
3	Credit hours (theory, practical)	2 Theoretical
	Contact hours (theory, practical)	2 hours per week, theoretical
4	Prerequisites/corequisites	1202333 Pharmaceutical Technology 2
5	Program title	Bachelor of Science in Pharmacy
6	Program code	-
7	Awarding institution	The University of Jordan
8	Faculty	Pharmacy
9	Department	Department of Pharmaceutics and Pharmaceutical Technology
10	Level of course	Undergraduate
11	Year of study and semester (s)	Fifth year
12	Final Qualification	Bachelor of Science in Pharmacy
13	Other department (s) involved in teaching the course	None
14	Language of Instruction	English
15	Date of production/revision	29 February 2016

16. Course Coordinator:

Office numbers, office hours, phone numbers, and email addresses should be listed.

17. Other instructors:

Office numbers, office hours, phone numbers, and email addresses should be listed.

18. Course Description:

The course addresses issues with nonconventional dosage forms including particulate system, lipid based drug delivery systems and gastroretentive dosage forms and solid solutions/dispersions with emphasis on their application in optimizing drug absorption and bioavailability.

19. Course aims and outcomes:

A- Aims:

1. To recognize challenges encountered when attempting oral delivery of drugs
2. To understand the effect of solubility and dissolution enhancement on optimizing drug delivery
3. To understand the mechanisms through which different delivery systems ensure and optimize bioavailability
4. To know the different methods of manufacturing solid solutions / dispersions
5. To know the different types of lipid based formulations
6. To know the different technologies involved in gastroretention of a dosage form
7. To be able to suggest suitable delivery technology based on physical and biopharmaceutical properties of a drug

B- Course Intended Learning Outcomes (ILOs):

Upon successful completion of this course students will be able to …

a. Knowledge and understanding:

1. To be able to define solubility, dissolution rate, intrinsic solubility and the effect of a drugs physicochemical properties on them
2. To understand the energetics of solubility and the relationship between the enthalpies of sublimation, melting and hydration to the free energy of solubility.
3. To understand the effects of chemical modification of the structure of a drug on its biopharmaceutical properties and formulation choices.
4. To understand the concept of biorelevant dissolution and solubility.
5. To know the different physical molecular arrangements in a solid solution / dispersion type formulation
6. To know the different methods of manufacturing of solid solution/dispersion
7. To know the methods used in characterizing the internal structure and performance of a solid solution/dispersion type formulation
8. To know the different classes of lipid based formulations
9. To know the excipients used in lipid based formulations
10. To know the different methods of assessing the performance of lipid based formulations in terms of drug release and stability
11. To know the applications of a gastroretentive dosage form
12. To know the different types of technology used in manufacturing of a gastroretentive dosage form
13. To know the methods of evaluation of gastro retention.

b. Intellectual skills:

1. To be able suggest methods for the evaluation of solubility of a drug
2. To be able to suggest a suitable materials and method for manufacturing a solid solution/dispersion based on API properties
3. To be able to interpret the results of different characterization methods for solid solution/dispersion
4. To be able to suggest suitable lipid based formulation based on API properties
5. To understand the differences in physical properties between different classes of excipients used in lipid based formulations
6. To be able to suggest a suitable based on API properties
7. To be able to analyze and critically evaluate case studies in pharmaceutical formulation presented in the course

c. *Subject-specific skills:*

1. Deductive reasoning
2. Numerical Analysis
3. Written/oral communication
4. Information retrieval and analysis
5. Practical application of theory
6. Report writing

d. Transferable skills

1. To gains knowledge and analytical skills to work with people in pharmaceutical firms.
2. To have the ability for quick adaptation to the working environment in pharmaceutical firms
3. To have the ability to deal with and suggest solutions to the problems encountered during the manufacturing process of pharmaceutical dosage forms in pharmaceutical firms.

C. Program Competencies Achieved:

1. Identify physiochemical properties of drug substances
2. Recognize the role of pharmaceutical excipients and their uses in drug formulations
3. Characterize various pharmaceutical dosage forms
4. Identify formulation principles and product development stages
5. Recognize various pharmaceutical manufacturing processes
6. Demonstrate the ability to perform pharmaceutical calculations
7. Comply with principles of good manufacturing practice (GMP) and good laboratory practice (GLP)
8. Recognize quality assurance principles
9. Recognize quality control principles
10. Identify analytical method development and validation used in pharmaceutical analysis
11. Demonstrate the ability to perform proper documentation
12. Identify the general principles of environmental control within pharmaceutical manufacturing sites

20. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
Barriers to effective (oral) drug delivery: Stability, Solubility and Permeation	1	Section Instructor	A1-4, B1, C1-6, D1-3	Oral Discussion, Reports, Exams	
Biopharmaceutical classification system and bioavailability.	2	Section Instructor	A1-4, B1, C1-6, D1-3	Oral Discussion, Reports, Exams	
Solubility and dissolution theory: Definitions, Measurement and Energetics of solubility	3+4	Section Instructor	A1-4, B1, C1-6, D1-3	Oral Discussion, Reports, Exams	
Prodrug formation	5+6	Section Instructor	A1-4, B1, C1-6, D1-3	Oral Discussion, Reports, Exams	
Solid dispersions and solid solutions	7+8+9	Section Instructor	A5-7, B2-3, C1-6, D1-3	Oral Discussion, Reports, Exams	
Lipid based drug delivery systems	10+11 +12	Section Instructor	A8-10, B4-5, C1-6, D1-3	Oral Discussion, Reports, Exams	
Bioavailability enhancement by targeting: Gastroretentive dosage forms	13+14	Section Instructor	A11-13, 6-7, C1-6, D1-3	Oral Discussion, Reports, Exams	

21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

Lecturing, Oral Discussion

22. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

. Reports and Home Works
. Exams

23. Course Policies:

A- Attendance policies:

University Regulation Applied

B- Absences from exams and handing in assignments on time:

University Regulation Applied

C- Health and safety procedures:

University Regulation Applied

D- Honesty policy regarding cheating, plagiarism, misbehavior:

University Regulation Applied

E- Grading policy:

University Regulation Applied

F- Available university services that support achievement in the course:

Library.

24. Required equipment:

NA

25. References:

A- Required book (s), assigned reading and audio-visuals:

1. Physiological Pharmaceutics: Barriers to Drug Absorption, Neena Washington, Clive Washington, and Clive Wilson, Taylor & Francis Series in Pharmaceutical Sciences, 2000.
2. Modern Pharmaceutics, Volume 1: Basic Principles and Systems. Informa Health Care Series: Drugs and the Pharmaceutical Sciences. Alexander T. Florence and Juergen Siepmann, Fifth Edition, 2009.
3. Water-Insoluble Drug Formulation. Rong Liu. CRC; 2nd edition, 2008.
4. Pharmaceutical Dissolution Testing. Jennifer J. Dressman and Johannes Kramer. Informa HealthCare; 2005.

B- Recommended books, materials, and media:

26. Additional information:

NA

Name of Course Coordinator: ----------Signature: ---------- Date: ----------

Head of curriculum committee/Department: ---------- Signature: ----------

Head of Department: ---------- Signature: ----------

Head of curriculum committee/Faculty: ---------- Signature: ----------

Dean: ---------- -Signature: ----------

Copy to:

Head of Department
Assistant Dean for Quality Assurance
Course File