Chitkara College of Pharmacy
Chitkara University, Rajpura, Punjab
Chandigarh–Patiala National Highway, Punjab – 140 401, India

Institute/School Name	Chitkara College of Pharmacy		
Department Name	Pharmacy		
Programme Name	B.Pharmacy		
Course Name	Novel Drug Delivery system	**Session**	July-Dec 25
Course Code	BP-704T	**Semester/Batch**	7th /2022
L-T (Per Week)	3-1	**Course Credits**	4
Pre-requisite	Pharmaceutics basic knowledge	**NHEQF Level**	6
Course Coordinator	Dr. Pallavi Bassi		
SDG	3		

Objectives of the Course: This subject is designed to impart basic knowledge on the area of novel drug delivery systems.

Course Outcomes (COs)

Students should be able to:

	COs	**Program Outcomes (PO)**	**NHEQF Level Descriptor**	**No. of Lectures**
CO01	Understand various approaches for development and Evaluation of controlled drug delivery systems. The criteria for selection of drugs and polymers for the development of NDDS	1, 3,6	Q1	**11**
CO02	Design controlled release formulations based on microencapsulation, mucoadhesion or implants	1, 2,11	Q3	**11**
CO03	Cognize the concepts, approaches and applications related to transdermal, gastro retentive and nasopulmonary route	1, 11, 9	Q3	**11**
CO04	Understand concepts and applications of targeted drug delivery as applicable to biomedical field, intrauterine and ocular drug delivery	1, 11, 12	Q1, Q2	**12**
Total Contact Hours				**45**

***NHEQF-**

CO-PO Mapping

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**Type of Assessment's**
CO01	3	3		3					2			Summative/ Formative
CO02	3	3	2	3								Summative/ Formative

CO03	3	3	2	3					2			Summative/ Formative
CO04	3	3	2	3					2			Summative/ Formative

3=High, 2=Medium, 1=Low

Recommended Books:

B01: Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.

B02: Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker, Inc., New York, 1992.

B 03: Encyclopedia of Controlled Delivery. Edith Mathiowitz, Published by Wiley Interscience Publication, John Wiley and Sons, Inc, New York. Chichester/Weinheim

B04: N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers and Distributors, New Delhi, First edition 1997 (reprint in 2001).

B05: S.P. Vyas and R.K. Khar, Controlled Drug Delivery -concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002.

Other readings and relevant websites:

Serial No	Link of Journals, Magazines, websites and Research Papers
1.	Indian Pharmacopoeia
2.	J of Drug Delivery Science and technology
3.	Indian Journal of Pharmaceutical Sciences (IPA)
4.	Indian Drug (IDMA)
5.	Journal of Controlled Release (Elsevier Sciences)
6.	Drug Development and Industrial Pharmacy(Marcel & Decker)
7.	International Journal of Pharmaceutics (Elsevier Sciences)

Lecture Plan

Lec no.	Topic	Book no, Ch no, page no.	TLM	ALM	Web References	Audio-video
1-5	CDDS: introduction, terminology/definitions and rationale Advantages-ion exchange principles	2; ch- 1, 4,5,7 2; ch-1,	Lecture, Active learning, Discussion, Inductive teaching	Discussion, Questioning	https://www.thepharmajournal.com/archives/2012/vol1issue10/PartA/3.1.pdf	
6-7	Physiochemical and biological properties of drugs relevant to controlled release formulation	2; ch-1 , 12-16	Lecture, Active learning, Discussion, Inductive teaching	Discussion, Questioning	https://www.thepharmajournal.com/archives/2012/vol1issue10/PartA/3.1.pdf	
8-9	POLYMERS:Introduction, classification, properties	2; ch-3 , 140-141, 164	Lecture, Active learning, Discussion, Inductive teaching	Discussion, Questioning	https://www.slideshare.net/slideshow/polymers-in-controlled-release-drug-delivery-system/250606885	

9-10	Applications of polymers in formulation of controlled release drug delivery system, Advantages of polymers	2; ch-4 , 179	Lecture, Active learning, Discussion, Inductive teaching	Discussion , Questioning		
11, 12	MICROENCAPSULATION: Intro, advantages Disadvantages-microparticles	1,ch-4, 61-71	Lecture, Active learning, Discussion, Inductive teaching	Discussion , Questioning		
13-15	Methods of microencapsulation, applications	1, ch-4, 74-82	Lecture, Active learning, Discussion, Inductive teaching	Discussion , Questioning		
16-17	MUCOSAL DRUG DELIVERY		Lecture, Active learning, Discussion, Inductive teaching	Discussion , Questioning	https://www.slideshare.net/slideshow/mucoadhesive-drug-delivery-system/16734757	
18	IMPLANTABLE DDS: introduction, Advantages and disadvantages	3, pg-449-450 2, page: 509	Lecture, Active learning, Discussion, Inductive teaching	Discussion , Questioning		
19-20	Concept of implants and osmotic pumps	3, pg-450-460	Lecture, Active learning, Discussion, Inductive teaching	Discussion , Questioning		
21	TRANSDERMAL DDS: intro, permeation through skin	2, 524-531	Lecture, Active learning, Discussion, Inductive teaching	Discussion , Questioning		
22	Factors affecting permeation, permation	1, page-122	Lecture, Active learning, Discussion, Inductive teaching	Discussion , Questioning		
23-24	Basic components of TDDS	1, pg-128,129	Lecture, Active learning, Discussion, Inductive teaching	Discussion , Questioning	https://www.slideshare.net/slideshow/transdermal-drug-delivery-system-119177012/119177012	
25-26	GRDDS: intro-application , Formulation approaches	1, pg-48-56 2, page-532-538	Lecture, Active learning, Discussion, Inductive teaching	Discussion , Questioning		

27-30	NASOPULMONARY DDS: introduction, formulation of inhalers-nebulizers	1, pg: 141-148, 151	Lecture, Active learning, Discussion, Inductive teaching	Discussion, Questioning		
31-33	TARGETTED DDS: concepts-disadvantages	1, 25-30	Lecture, Active learning, Discussion, Inductive teaching	Discussion, Questioning		
34-37	Introduction to liposomes-monoclonal antibodies	1, page:35-38	Lecture, Active learning, Discussion, Inductive teaching	Discussion, Questioning		
38	Targeting applications	1, page: 41-44	Lecture, Active learning, Discussion, Inductive teaching	Discussion, Questioning		
39-41	Occular DDS: Intro-occuserts	3, page: 389-397	Lecture, Active learning, Discussion, Inductive teaching	Discussion, Questioning		
42-45	Intrauterine delivery systems		Lecture, Active learning, Discussion, Inductive teaching	Discussion, Questioning	https://www.slideshare.net/slideshow/intrauterine-intravaginal-drug-delivery-system/45543696	

Teacher in-charge Assistant Dean Dean