

Course Code	Course Title	Teaching Load			Marks		Exam (hrs)		Credits
		L	T	P	Int.	Ext.	Int.	Ext.	
BP704T	Novel Drug Delivery Systems	3	1	-	25	75	1	3	4

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

Objectives: Upon completion of the course, student shall be able

1. To understand various approaches for development of novel drug delivery systems.
2. To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation

Module 01

10 Hours

Controlled Drug Delivery Systems

- Introduction, terminology/definitions and rationale, advantages, disadvantages, selection of drug candidates.
- Approaches to design controlled release formulations based on diffusion, dissolution and ion exchange principles.
- Physicochemical and biological properties of drugs relevant to controlled release formulations

Polymers

- Introduction, classification, properties, advantages and application of polymers in formulation of controlled release drug delivery systems.

Module 02

10 Hours

Microencapsulation

- Definition, advantages and disadvantages, microspheres /microcapsules, microparticles, methods of microencapsulation, applications.

Mucosal Drug Delivery system

- Introduction, Principles of bioadhesion/ mucoadhesion, concepts, advantages and disadvantages, transmucosal permeability and formulation considerations of buccal delivery systems

Implantable Drug Delivery System

- Introduction, advantages and disadvantages, concept of implants and osmotic pump.

Module 03

10 Hours

Transdermal Drug Delivery Systems

- Introduction, Permeation through skin, factors affecting permeation, permeation enhancers, basic components of TDDS, formulation approaches

Gastroretentive Drug Delivery Systems

- Introduction, advantages, disadvantages, approaches for GRDDS – Floating, high-density systems, inflatable and gastro-adhesive systems and their applications

Nasopulmonary Drug Delivery System

- Introduction to Nasal and Pulmonary routes of drug delivery, Formulation of Inhalers (dry powder and metered dose), nasal sprays, nebulizers.

Module 04

08 Hours

Targeted Drug Delivery

- Concepts and approaches advantages and disadvantages, introduction to liposomes, niosomes, nanoparticles, monoclonal antibodies and their applications.

Module 05

07 Hours

Ocular Drug Delivery Systems

- Introduction, intra ocular barriers and methods to overcome –Preliminary study, ocular formulations and ocuserts.

Intrauterine Drug Delivery Systems

- Introduction, advantages and disadvantages, development of intra uterine devices (IUDs) and applications.

Recommended Books: (Latest Editions)

1. Y W. Chien, Novel Drug Delivery S ystems, revised and expanded, Marcel Dekker, Inc., New York.
2. Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker, Inc., New York.
3. Encyclopedia of Controlled Delivery. Edith Mathiowitz, Published by Wiley Interscience Publication, John Wiley and Sons, Inc, New York. Chichester/Weinheim.
4. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi.
5. S.P. Vyas and R.K. Khar, Controlled Drug Delivery -concepts and advances, Vallabh Prakashan, New Delhi.

Journals

1. Indian Journal of Pharmaceutical Sciences (IPA).
2. Indian Drugs (IDMA).
3. Journal of Controlled Release (Elsevier Sciences).
4. Drug Development and Industrial Pharmacy (Marcel & Decker).
5. International Journal of Pharmaceutics (Elsevier Sciences).