

(B. Pharm)
(Semester - VII)

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Course Code	BP704T
Course Title	Novel drug delivery systems -Theory

Scope:

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

Objectives:

Upon completion of the course the student should be able to:

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

Course Learning Outcomes (CLO):

At the end of the course, students will be able to -

1. Identify various approaches for controlled release formulations based on diffusion, dissolution and ion exchange principles.
2. Understand mucoadhesion, microencapsulation and osmotic system
3. Explain topical, oral and intranasal delivery of the formulations
4. Describe and select polymer for controlled release formulations
5. Apply the concept of nanotechnology for targeted drug delivery
6. Design ophthalmic formulations and intrauterine devices

Syllabus:

Teaching hours: 45 Hours

UNIT I

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.

UNIT II

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 Systems: Introduction, advantages and disadvantages, concept of implants and osmotic pump

UNIT – III

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 gastroadhesive 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

UNIT – IV

8 Hours

Nanotechnology and its Concepts: Concepts and approaches for targeted drug delivery systems, advantages and disadvantages, introduction to liposomes, niosomes, nanoparticles, monoclonal antibodies and their applications

UNIT – V

7 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

Tutorials

Teaching Hours: 15 Hours

Tutorials will be based on above syllabus.

Suggested Readings[^]: (Latest edition)

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

Journals

1. Indian Journal of Pharmaceutical Sciences
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)

L= Lecture, T= Tutorial, C= Credit

[^] this is not an exhaustive list