BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus

INSTRUCTION DIVISION
FIRST SEMESTER 2015-2016
Course Handout (Part II)

Date: 03/08/2015

In-addition to Part – I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course

Course No : **PHA G 617**
Course Title : Advanced Drug Delivery Systems
Instructor-in-charge : Dr. DEEPAK CHITKARA
Instructor : Emil Joseph

1. **Course Description**

   A study of physicochemical, biopharmaceutical and physiological factors involved in the design of novel drug delivery systems like mucosal, particulate systems for systemic delivery of bioactive molecules. Special considerations for delivery of protein, peptide and other biological products. In vitro and in vivo evaluation of novel drug delivery systems.

2. **Scope and objective of the course :**

   The prime objective of this course is to impart knowledge of design, development and evaluation of novel drug delivery systems (NDDS). The primary focus would be on integrating the biopharmaceutical, physiochemical and physiological properties for design and development of (NDDS) with due consideration of pharmacological action. Excipients used in design and development of NDDS would be covered exhaustively. Various techniques involved in in vitro and in vivo evaluation of NDDS would be dealt at length. Special impetus would be given to IVIVC.

3. **Text Book:**
   i. Tyle, P. Specialized Drug Delivery Systems- Manufacturing and Production Technology, Marcel Dekker, New York, 1990

4. **Reference Book:**
   i. Prescott, L.F., and Nimmo, W.S. Novel Drug Delivery, John Wiley & Sons, Chichester, 1989.
   ii. McNally, E. J. Protein Formulation and Delivery, Marcel Dekker, New York, 2000.
   iii. Frokjaer, S., and Hovgaard, L. Pharmaceutical Formulation Development of Peptides and Proteins, Taylor and Francis, London, 2000.

5. **Course Plan:**

Lect. No.	Learning Objectives	Topics to Covered	Ref. Chap/Sc # (Book)
1-2	Overview of NDDS, Opportunities and challenges	General Introduction	T.1 CH.1
3-4	Various aspects affecting design, development and selection of	Physicochemical, Biopharmaceutical and Physiological factors important	R.3 CH. 2 &7

	NDDS	for design of NDDS	
5-7	Techniques used for development of NDDS	Various Techniques involved in development of NDDS	R.3 CH. 2 &7
8-10	Design and Physical characterization of particulate drug delivery systems	Microparticles Nanoparticles	T.1 CH.5
11-13	Targeted Drug delivery	Various drug delivery systems for site specific targeting	R.3 CH.9,25,&32
14-21	Design of transmucosal drug delivery systems	Buccal and Sublingual Ocular Nasal Pulmonary route Transdermal	T.1 CH.8, R.2 CH.14 15 16
22-24	Drug delivery of proteins and peptides	Basic considerations in the design of Protein/Peptide based delivery systems	T.1 CH.6, R.1 CH.29, R.2 CH.5
24-31	In vitro Characterization	Various methods and techniques for in-vitro drug release and other characterization of NDDS	These are advanced topics and will be covered using journal articles. Federal guidelines keep on changing so latest guidelines would be covered.
32-34	In vivo Characterization and Evaluation	Selection of appropriate animal models for evaluation of various NDDS	
35-36	Novel Delivery devices	Various devices for controlled and site specific drug delivery	
37-38	IVIVC	In vitro in vivo correlation	
39-40	PK/PD modeling	PK/PD modeling	

6. **Evaluation Scheme:**

Component	Duration	Weightage (%)	Date & Time	Remarks
Mid Term Test	90 min	30	10/10 10:00 - 11:30 AM	CB
Assignment/Lab Project/Group Discussion/Seminar		35		
Comprehensive Exam	3 Hrs	35	12/12 AN	CB+OB

7. **Attendance:** Regularity in attendance will be one of the criteria in deciding borderline cases at the time of final grading.
8. **Notices**: Pharmacy Notice Board.
9. **Chamber Consultation Hour:** To be announced in the class.

10. **Make-up Policy:** Make-ups are not given as a routine. It is solely dependent on the "genuineness" of the circumstances under which a student fails to appear in a scheduled evaluation component. Prior permission should be sought from the instructor-in-charge in advance.

Instructor-in-charge