16.1.2021

Second Semester 2020-2021
Course Handout

In addition to Part I (General Handout for all courses appended to the Time Table) this portion further specific details regarding the course.

Course No. : BIOT F416
Course Title : **Introduction to Pharmaceutical Biotechnology**
Instructor-in-charge : Vishal Saxena

1. Course Description:
The course is designed to provide advances in drug development, drug delivery systems and pharmaceutical specialties including polypeptides, proteins, viruses, DNA and antibiotics. It covers relevant aspects for the development of new bi technology based drugs, target identification, downstream processing and formulation. Special emphasis is given on understanding the mechanisms and process involved in diseases.

2. Scope and Objective of the Course:
This course is designed to impart knowledge of pharmaceutical biotechnology. It is organized to make the students understand various concepts and applications of biotechnology in pharmaceuticals. It helps analyze current and newly emerging areas for research and development of biopharmaceuticals and their applications.

3. Course Material:
Text book [TB] : Pharmaceutical Biotechnology: Concepts and Applications, Gary Walsh. Publishers: John Wiley & Sons, 2007.
Reference book(s) [RB]: Pharmaceutical Biotechnology, second edition. Crommelin J.A., Sindelar R.D. Routledge-Taylor & Francis London, New York, 2003

4. Course Plan / Schedule:

Lec. No	Learning objectives	Topics to be covered	Ref. to Text Book *	Learning Outcomes
1-2	Pharmaceutical biotechnology	Introduction, pharmaceuticals, biopharmaceuticals, biologics, developments	Chap# 1	Introduction to the course
3-8	Recombinant DNA technology in biopharmaceuticals	Genomics, Recombinant protein production technology, gene manipulations, heterologous protein expression for pharmaceutical applications, protein engineering	Chap# 3	Understanding on use of rDNA technology to study proteins
9-11	Proteins targets and cellular modifications	Protein Structures, Principles and modes of protein target selection, post translational modifications, Protein analysis techniques	Chap# 2	Understanding of protein selection & its translation process
12-16	Biopharmaceutical development process, pharmacokinetics and pharmacodynamics	Discovery of biopharmaceuticals, impact of proteomics, genomics, drug delivery, protein pharmacokinetics and pharmacodynamics	Chap# 4	Understanding on biopharmaceuticals and their applications
17-20	Cytokines, interferons, interleukins, tumor necrosis factor	Interferon use and productions, Interleukin production, safety issues, tumor necrosis factor and therapeutic effects	Chap# 8, 9	Knowledge on in-situ cytokine production techniques

21-25	Growth factors, hematopoietic growth factors, wound healing	Hematopoietic growth factors, erythropoietin, insulin like growth factors, epidermal, platelet derived, fibroblast, transforming growth factors, and biological effects	Chap# 10	Knowledge on various growth factors and their applications
26-29	hormones, diabetes mellitus, glucagon, human growth hormones	Therapeutic hormones, Insulin, production, formulations, recombinant insulin, insulin administration, glucagon, applications, human growth hormone, receptors, therapeutics effects, applications	Chap# 11	Knowledge on various hormones etc and their applications
30-33	Recombinant blood products, enzymes	Hemostasis, anticoagulants, thrombolytic agents	Chap# 12	Learning on various biological products, their in-situ productions and application as biopharmaceuticals
34-37	Antibodies and vaccines	Vaccine technology, peptide vaccines, production, recombinant vaccines, cancer vaccines	Chap# 13	
38-41	Nucleic acid and cell based therapeutics	Gene therapy, AIDS, gene based vaccines	Chap# 14	Knowledge on Nucleic acid therapeutics
		Total number of classes planned: 41		

= Reference material will be provided as and when required.

5. **Evaluation scheme:**

EC No.	Components	Weightage %	Date & Time Venue	Remarks
1	Mid-Semester Examination	30		Closed Book
2	Quiz/ Seminar/ Assignments	**30**		Closed Book/ Open Book
3	Comprehensive Examination	40		Closed Book/ Open Book

6. **Chamber Consultation Hours:** To be announced in the class.
7. **Notice:** Notices for tests will be displayed on Biological Sciences Notice Board. Quizzes will be unannounced.
8. **Makeup Policy:** Makeups for quizzes, seminar or assignment will not be granted. Make-ups for Tests will be granted only in case of severe medical urgency or hospitalization.

Instructor-in-Charge

BIOT F416