BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE. PILANI
INSTRUCTION DIVISION
FIRST SEMESTER 2016-2017

Course Handout

Date: 26/07 /2016

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 G613**
Course Title : Pharmaceutical Biotechnology
Instructor-in-charge : MURALI M PANDEY
Instructor :

Scope and objective of the course:

The course deals with the principles and techniques of biotechnology with direct application in the field of pharmaceutical sciences. It aims at bringing together the principles of molecular biology, molecular genetics, biochemical engineering, protein engineering, enzymtechnology, bio-informatics required to develop a successful biotechnology based pharmaceutical product. The applications of genetic engineering, recombinant DNA technology, hybridoma technology, transgenic animals, gene therapy, drug delivery aspects of biotechnology products and their clinical evaluation are also dealt with in this course.

1. Text Book (TB):

Bernard R. Glick, Jack J. Pasternak, Molecular Biotechnology- Principles and Apllication of rDNA. 2nd edition, ASM Press, Washington, 1998.

2. Reference Books (R):

R1: Brown T. A., Gene Cloning & DNA Analysis An Introduction 6th edition. Blackwell Publishing, UK, 2010.

R2: Balasubramanian D., Bryce, C.F.A., Dharmalingam, K., Green, J., Jayaraman, K. Concepts in Biotechnology, urvey University Press, Hyderabad, India, 1996.

3. Course Plan:

Lecture No.	Learning Objectives	Topic to be covered	Reference
1	Introducing biotechnology	Introduction to cell biology and biotechnology-the revolution	TB: Chap 1
2-8	Theoretical basis of molecular biotechnology (*To bring students from different background to the same level)*	Structural & functional dynamics of cell; Basic genetic material and their replication; DNA expression & protein synthesis; Biological systems used in biotechnology	Class notes and slides
9-11	Chemical synthesis of DNA	Chemical synthesis, sequencing and amplification of DNA	TB: Chap 5 R1: 9, 10
12-18	Recombinant DNA technique	Principles and procedures in recombinant DNA technique	R1: Chap 4, 5, 6, 7
19-21	Application of rDNA technology in synthesis of commercial products	Manipulation of gene expression in prokaryotes and eukaryotes; Recombinant protein production; Microbial production of therapeutic & prophylactic agents	TB: Chap 6, 7, 10
22-24	Application of mutagenesis in protein engineering	Random and site-directed mutagenesis and protein engineering	TB: Chap 8
25-27	Immobilsation techniques and their application	Methods of protein and enzyme immobilization; Application in bioreactors; diagnostics and drug delivery	
28-31	Genetic engineering in animals and their application	Human molecular genetics; Transgenic animals; Human gene therapy	TB: Chap 20, 19, 21
32-33	Genetic engineering in plants and their application	Plant genetic engineering methodology and application	TB: Chap 17, 18
34-36	Application of biotechnology & immunotechnology in molecular diagnostics	Application of hybridoma technology, mono-clonal antibody based products, vaccinology	TB: Chap 9
37-38	Principles of biochemical engineering in the production of biotechnology based products	Fermentation systems, bio reactor design, raw materials, down stream processing, scale-up, issues in production and purification of proteins	TB: Chap 16
39-40	Understanding bio-informatics; high throughput DNA sequencing and proteomics	Introductory basis of bio-informatics and pattern recognition in DNA and protein sequences; High throughput DNA and proteomics;	R2: Chap 14 Class notes and journal references
41	Gene cloning and DNA analysis in medicine	Production of recombinant pharmaceuticals, Identification of gene responsible for human diseases	R1: Chapter 14

4. Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Remarks
Mid Term	90 mts.	30	3/10 8:00 - 9:30 AM	CB
Seminar- Assignments		10	To be announced*	
Lab work		20		
Comprehensive Exam	180 mts.	40	1/12 AN	CB+OB

*- Will be announced in the class at the beginning of the semester

5. **Contact hour:** Timings will be announced through the Institute Time Table.

6. **Notices**: Notices concerning the course will be displayed in the Pharmacy Group notice board only.

7. **Chamber Consultation Hours:** To be announced in the class.

8. **Make-up:** Prior approval or intimation to take a make-up is a must. It is solely the discretion of the instructor-in-charge dependent upon the genuineness of the circumstances to allow a student to appear for a make-up evaluation component.

9. **Grading policy:** As specified in Handout – Part I, appended to the timetable. The instructor in-charge reserves the right to award a NC report in case the student does not make himself or herself available for any of the evaluation component mentioned above. Also it is not imperative on part of the instructor in charge to award all the grades. Borderline cases during grading will be judged on the basis of regularity to classes and consistency or progress in the performance in evaluation components. The maximum pull-up to be exercised by the instructor in-charge will be announced in the class and shall be based on the subjective judgment of the evaluator.

Instructor-in-charge
PHA G613