BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus
Instruction Division

SECOND SEMESTER 2015-16

Course Handout

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 Number : BIO C231
Course Title : Biology Project Lab
Instructor-In-charge : SANDHYA MEHROTRA
Team of Instructors : Monica Jangir, Manohar Lal, Gurpreet Kaur Sidhu

Scope & Objective of the Course:

Objective of this course is to enable students to design and execute targeted research project as well as to analyze results obtained. The objectives include exploration of micro-organisms which produce amylase enzyme. The experiment involves isolation of amylase enzyme from various bacterial species and subsequent analysis of the kinetics of the purified enzyme with respect to a commercially available one and characterization of the micro-organisms using bioinformatics tools. The students will also be carrying out inhibitor and cytotoxicity assays in animal cell-lines to assess the toxic effects, if any, of the inhibitor(s). As a part of the course, visits to various labs in the department will be planned to gain off hand information about the research work going on in various laboratories of the department.

Suggested Readings: Reviews and Research articles related to work plan and those discussed in the lecture class. Protocols of the experiments will be made available to students as soft copies.

Course Plan

S. No.	Learning Objective	Name of the experiment
Project 1	**Collection, identification and characterization of amylase producing bacteria from natural sources**	
Experiment 1	Identification of sources where microbial isolates could be found	Isolation of amylase producing bacteria from different sources
Experiment 2	Learning various methods of isolation of enzymes from microbes	Crude isolation of amylase from the bacteria
Experiment 3	Learning universal concepts and principals of enzyme assay	Perform enzyme kinetics in presence of inhibitor(s)
Experiment 4	Learning molecular biological and bioinformatic tools for identification of an unknown organism	Molecular characterization of amylase producing bacteria using molecular biology and bioinformatics tools

Project 2:	***In vitro* culture, maintenance and propagation of human cell lines**	
Experiment 1	Learning about human cell lines and their significance in research	Thawing and recovering human adherent cell line (MCF 7).
Experiment 2	Learning how mammalian cells can be collected for propagation in laboratory	Trypsinizing and subculturing adherent cell lines (Hep3B).
Experiment 3	Learning how cells can be counted and analyzed in vitro	Trypan blue assay to check viability of K562 cells and the total cell count by using a hemacytometer
Experiment 4	Learning how cancer cells are used in vitro to check the effect of drugs	MTT assay of non-adherent cells (K562) to check the cytotoxicity of a given drug on cancer cells
Experiment 5	Preserving cells for experimental purposes	Cryopreservation of K562 cells.
Project 3	Learning about various research activities carried out by different research groups at the Biological Sciences department of BITS, Pilani	Visit laboratories of Biosciences department to learn about the research work being carried out and make a comprehensive report of the same. Note: This will be overlapping in time zones and will be spread throughout the semester.

Evaluation scheme

Sr. No.	**Evaluation component**	**Duration**	**Weightage**	**Date, Time & Venue**
1.	Laboratory evaluation		40%	Regular
2.	Assignment/Seminar		5%	To be announced in the class
3.	Mid-term test	1.5 h	25%	15/3 2:00 -3:30 PM
4.	Comprehensive Exam	2.0 h	30%	6/5 FN

Make up policy: No make-up will be granted for regular experiments. Students must see that they are regular and punctual for the laboratory classes. Make up, if any, for other evaluation components will be upon the sole discretion of the I/C and will be decided on case by case basis.
Chamber consultation hour: To be announced in the class.

Notices will be displayed on Biological Sciences Notice Board.

(Instructor In Charge)