



In addition to Part One (General Handout for all courses appended to the time table) this part gives further specific details regarding the course.

Course No. : BIO G642
Course Title : Experimental Techniques
Instructor-in-charge : SUDESHNA M CHOWDHURY
Instructor : Vishal Saxena, Gagandeep S. Saggu, Leena Frageria&Ranita De

1. Scope and Objective of the Course: Specially designed laboratory course which aims to give hands on practical exposure in selected range of molecular biology and immunology techniques such as salt fractionation, dialysis, RNA extraction, Northern Blotting, RT-PCR, qPCR, Protein expression from recombinant clones, PAGE with discontinuous buffer solution, Western Blotting, 2D-PAGE, Ion-exchange chromatography, HPLC, antigen – antibody assays- ELISA

2. Reference Books:

- R1. Molecular Cloning: A Laboratory Manual, by J. Sambrook, P. MacCallum and D. Russell.
3rd edition (three-book set). New York, USA: CSHL Press, 2001.
- R2. Short Protocols in Molecular Biology – by F. Ausubel, R. Brent, R. E. Kingston, D.D. Moore, J. G. Seidman, J. A. Smith, K. Struhl. John Wiley & Sons Inc., USA
- R3. A Handbook of Genetic Engineering, by U. Roy and V. Saxena, Kalyani Publisher

3. Course Plan:

S. No.	Learning Objectives
1.	RNA extraction and analysis
2.	Transfer of nucleic acids to nitrocellulose/ nylon membrane and detection
3.	Reverse Transcriptase PCR technique and RACE
4.	Quantitative PCR and its applications.
5.	Expression, detection and analysis of recombinant proteins isolated from bacteria
6.	Methods of protein isolation and analysis, Salting In and Out, dialysis
7.	Purification of Nucleic acids and proteins: Affinity and Ion- exchange chromatography
8.	Iso-electric Focusing and preparations
9.	Two- Dimensional Poly-acrylamide Gel electrophoresis and its analysis
10.	Antibody preparation and Antigen – Antibody assays
11.	Bioinformatic techniques for protein sequence and structure analysis

S. No.	Laboratory Objectives
1.	RNA extraction from bacterial culture, Quantitation and RNA gel electrophoresis
2.	Northern Transfer and Blotting
3.	Reverse Transcriptase– PCR





4.	Real-time PCR (qPCR)
5.	Recombinant Protein expression and analysis in <i>E. coli</i> by SDS – PAGE
6.	Ammonium Sulfate Precipitation of protein and Analysis by SDS–PAGE
7.	Western Transfer and Blotting
8.	Ion- exchange chromatography
9.	Iso-Electric Focusing (IEF) and Two Dimensional SDS- PAGE
10.	High - Performance Liquid Chromatography & FPLC
11.	ELISA
12.	Workout on online freely available Bioinformaticsoftwares for protein analysis

All Experiments are subjected to change as per the availability of the chemicals, kits and consumables.

4. Evaluation Scheme:

No.	Evaluation Component	Duration	Wtage (%)	Date, Time & Venue	Nature of Component
1.	Mid-Term Test	90 mins	20	14/3 11:00 - 12:30 PM	CB
2.	Lab Quizzes	15 mins	10	TBA	CB
3.	Lab Test	-	15	TBA	-
4.	Viva-Voce	-	10	TBA	
5.	Lab Records	-	10		OB
6.	Comprehensive Examination	3 hours	35	3/5 AN	CB+OB
			100		

TBA= To be announced

5. Guide to Writing Lab Reports: The report must be written on hard bound, covered practical files. It should include the followings:-

- Objective of the experiments;
- Theory on which the experiment is based;
- Steps in the experimental procedure;
- Results including all observation;
- Inference and Precautions

6. Grading: By means of class tests, Quizzes and day to day assessment including regularity, sincerity, co-operation, cleanliness, lab handling and punctuality.

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

8. Notice: Notices, will be displayed on the Department of Biological Sciences notice board

9. Make-up Policy: Only in the genuine case of illness, make-up will be granted. No make – up for daily Laboratory components and Practical component of examination.

Instructor-in-charge

BIO G642

