

Programme: M.Sc. Marine Biotechnology

Course code: MBO 193

Title of the course: LAB III - MOLECULAR BIOLOGY & GENETIC ENGINEERING

Number of credits: 3

Effective from: 2019-2020

Course Objectives	The objectives of this course are to provide students with the experimental knowledge of molecular biology and genetic engineering.	
Learning Outcomes	Students should be able to gain hands-on experience on gene cloning, protein expression and purification. This experience would enable them to begin a career in industry.	
Contents	<ol style="list-style-type: none">1. UV mutagenesis to isolate amino acid auxotroph.2. Transduction3. Phage titre with λ phage/M13.4. Genetic Transfer-Conjugation, gene mapping.5. Plasmid DNA isolation and DNA quantification.6. Restriction Enzyme digestion of plasmid DNA.7. Genomic DNA and RNA isolation8. Polymerase Chain reaction.9. Cloning of insert in to a plasmid vector10. Transformation of <i>E.coli</i> with standard plasmids, Calculation of transformation efficiency.11. Confirmation of the insert by Colony PCR and Restriction mapping12. Expression of recombinant protein, concept of soluble proteins and inclusion body formation in <i>E.coli</i>, SDS-PAGE analysis13. Purification of His-Tagged protein on Ni-NTA columns14. Southern hybridization.	72 hours
References/ Reading	<ol style="list-style-type: none">1) Laboratory Manual for GENETIC ENGINEERING 1st Edition (2009) S. JOHN VENNISON PHI Learning2) Molecular Cloning: A Laboratory Manual (Fourth Edition): Three-volume set 4th Edition (2012) by Michael R. Green , Joseph Sambrook	