EXTENDED LECTURE OUTLINE

SCI6 311 **Seri Biotechnology** **(1+1)**

- Introduction to Biotechnology, definition of Biotechnology, Scope and importance of Biotechnology in Sericulture industry
- Methods of plant tissue culture techniques. Micro propagation in mulberry, advantages and disadvantages and stages of micro propagation
- Secondary metabolites, Definition, examples, steps and Method of production, and their applications--Production of secondary metabolites by free-cell suspension cultures Immobilized cell culture, Two-phase system culture and Hairy root culture. through bioreactors
- Recombinant DNA technology – Introduction, Principles and applications in sericulture
- PCR Techniques and their types like Real Time PCR, RT-PCR, random PCR, Hot start PCR and applications of PCR
- Gene cloning - Importance of gene cloning, approaches of gene cloning, steps in gene cloning, requirements of gene cloning
- Restriction enzymes - Discovery and nomenclature of restriction of restriction enzymes, types of restriction enzymes, nature of DNA cleavage – blunt and sticky ends
- Vectors – Features of ideal vectors, classification of vectors – cloning vector and expression vector, plasmids – pBR 322 vector – structure of pBR 322, cloning with pBR 322 – selection of transformants and identification of recombinants. pUC8 vector – cloning with pUC8 – Blue – white screening or lac selection. Lamda phage vector – cloning with lamda phage, Selection strategies for recombinant phage, Cloning with cosmid, YAC, and BAC vectors
- Transgenic — Scope, Methods of Gene Transformation (Agrobacterium and Biolistic Gene gun method)
- Types of molecular markers, polymorphism detected by RFLP, RAPD, AFLP, and SSR. Advantages and limitations of RFLP, RAPD, AFLP, and SSR. Application of molecular markers in sericulture
- Gene silencing and its importance in sericulture, basic requirement and mechanism of gene silencing
- Genome Mapping – Introduction to Genetic mapping, physical mapping, and cytogenetic mapping, recombination percentage, Genetic distance vs physical distance
- CRISPR-Cas9 technology and its application in sericulture
- Introduction to Bioinformatics
- Principles, methods and applications of gene sequencing
- BmNPV Vector and its applications