EVEN SEMESTER PRACTICAL PLAN

Name of the college: Government College of Arts, Science and Commerce, Sanquelim Goa

Name of Faculty: Dr. Nisha Kevat	**Subject: Botany**	
Paper code: BOC 109 (Molecular Biology & Genetic Engineering)	**Program/Course: T.Y B.Sc.**	**Division: -**
Academic year: 2024 - 2025	**Semester: VI**	**Total Lectures: 60**

Course Objectives:

- This course is designed to have a basic understanding of the fundamental concepts of molecular biology such as structure of DNA, its synthesis and regulation of gene expression and to apply the knowledge in recombinant DNA technology.
- The theoretical and practical components of this course will provide a deeper understanding of various techniques in obtaining recombinant DNA and the varied applications of genetic engineering

Course Learning Outcome:

- Gain knowledge of the concepts of molecular biology such as structure of nucleic acids, replication, transcription and translation.
- Understand gene structure, regulation and modification of RNA.
- Understand the concepts of recombinant DNA technology and gene cloning and its various¬ applications

Month	Practical/Labs Scheduled	No. of Practicals/Labs planned	List of Experiment	Reference books

December	1st Week 11/12/2024	01 (4 Hours)	**Topic 1:** General laboratory methods and safety procedures	1. Watson, J.D., Baker, T.A., Bell, S.P., Gann, A., Levine, M. and Losick, R. 2007. Molecular Biology of the Gene. 6th edition. CSHL Press, New York, NY. 2. Snustad, D.P. and Simmons, M.J. 2010. Principles of Genetics. 5th edition. John Wiley and Sons Inc., U.S.A. 3. Klug, W.S., Cummings, M.R. and Spencer, C.A. 2009. Concepts of Genetics. 9th edition. Benjamin Cummings, U.S.A. 4. Russell, P.J. 2010. i-Genetics - A Molecular Approach. 3rd edition. Benjamin Cummings, U.S.A. 5. Griffiths, A.J.F., Wessler, S.R., Carroll, S.B. and Doebley, J. 2010. Introduction to Genetic
December	2nd Week 18/12/2024	01 (4 Hours)	**Topic 1:** Extraction of DNA from cauliflower	
January	3rd Week 08/01/2025	01 (4 Hours)	**Topic 1**: i. Estimation of DNA by diphenylamine method. ii. Estimation of RNA by Orcinol reagent	
January	4th Week 15/01/2025	01 (4 Hours)	**Topic 1**: Demonstration of separation of DNA by gel electrophoresis	
January	5th Week 22/01/2025	01 (4 Hours)	**Topic 1**: Extraction of RNA from plant material.	
January	6th Week 29/01/2025	01 (4 Hours)	**Topic 1:** Study of DNA replication mechanisms through models/photographs (Rolling circle, Theta replication and semi-discontinuous replication)	
February	7th Week 05/02/2025	01 (4 Hours)	**Topic 1**: Study of structures of pBR322,Ti plasmid,YAC, λ phage through models/photographs	
February	8th Week 12/02/2025	01 (4 Hours)	**Topic 1:** Culture of plasmid and maintenance of culture.	
February	9th Week 19/02/2025	01 (4 Hours)	**Topic 1:** Isolation of plasmid DNA	

February	10th Week 26/02/2025	01 (4 Hours)	**Topic 1 :** . Photographs establishing nucleic acid as genetic material (Avery et. al., Griffith's, Hershey & Chase's and Fraenkel & Conrat's experiments)	Analysis. 10th edition. W. H. Freeman and Co., U.S.A. 6. Glick, B.R. and Pasternak, J.J. 2003. Molecular Biotechnology - Principles and Applications of Recombinant DNA. ASM Press, Washington D.C. 7. Stewart, C.N. Jr. 2008. Plant Biotechnology & Genetics: Principles, Techniques and Applications. John Wiley & Sons Inc., U.S.A. Dubey, R.C. 1993. A Textbook of Biotechnology. S. Chand & Company Pvt. Ltd., New Delhi.
March	11th Week 05/03/2025	01 (4 Hours)	**Topic 1 :** Study of spliceosome machinery and alternative splicing mechanism through photographs. ii. Study of methods of gene transfer through photographs: Agrobacterium-mediated, microprojectile bombardment (gene gun).	
March	12th Week 12/03/2025	01 (4 Hours)	**Topic 1:** Study of steps of genetic engineering for production of Bt cotton, Golden rice, Flavr Savr tomato and humulin production through photographs. **Topic 2:** Deciphering DNA sequence from a sequencing gel photograph by Maxam and Gilbert's method.	
March	13th Week 19/03/2025	01 (4 Hours)	**Topic 1:** Deciphering DNA sequence from a sequencing gel photograph by Sanger and Coulson's method**.** **Topic 2:** Working of restriction enzyme & calculating the size of the fragments by use of maps.	
March	14th Week 26/03/2025	01 (4 Hours)	**Repeating of difficult practicals**	
April	15th Week 02/04/2025	01 (4 Hours)	**Repeating of difficult practicals**	

April	16th Week 09/04/2025	01 (4 Hours)	**Repeating of difficult practicals**	

*Note: Data filled in the above form is sample data.