EVEN SEMESTER LECTURE PLAN (AY 2025-2026)

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

Name of Faculty: Dr. Nisha Kevat	**Subject: Molecular Biology and Genetic Engineering**	
Paper code: BOT 306	**Program/Course: T.Y B.Sc.**	**Division: - --**
Academic year: 2025 - 2026	**Semester: VI**	**Total Lectures: 30 (PRACTICAL)**

Course Objectives:
1. Provide students with a comprehensive understanding of the principles of molecular biology.
2. Familiarize students with intricacies of genetic code and mechanisms of DNA replication, transcription and translation.
3. Enable students to understand the techniques used in recombinant DNA technology.
4. Impart knowledge of the applications of recombinant DNA technology and the ethical concerns related to it.

Course Learning Outcome:
1. Recall the structures of nucleic acids and characteristics of the genetic code.
2. Understand the fundamental concepts of DNA replication, transcription, translation, gene organization, gene regulation and recombinant DNA technology.
3. Apply the acquired knowledge of genetic engineering principles, methods of gene transfer in plants and DNA analyses to modify genetic material leading to production of novel crops and products.
4. Analyse the various applications of genetic engineering and their ethical concerns.

Month	Lectures From:	To:	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/Assignments	ICT Tools	Reference books
Week 1 December	1/12/2025	6/12/25	02	**Practical 1**: Study of Hershey & Chase's experiment and Frankel-Conrat's experiment using photographs.		Power Point Presentation, Chalk And Board, You Tube Study Videos	1. Agarwal, P (2017). Basic Concepts of Genetic Engineering. Pearson India Education Services, Chennai.

Week 2 December	8/12/25	13/12/25	02	**Practical 2:** Study of DNA replication mechanisms using models/ photographs (Rolling circle, Theta replication and semi-conservative replication).		Power Point Presentation, Chalk And Board, You Tube Study Videos	2. Alberts, B, Johnson, A, Lewis, J, Raff, M, Roberts, K and Walter, P (2014). Essential Cell Biology. 4th edition. Garland Science, New York. 3. Brown, TA (2017). Genomes 4. 4th edition. Garland Science, New York. 4. Chatterjee, R (2015). Molecular Biology of the Gene. Sapna Book 5. Dubey, RC (1993). A Textbook of Biotechnology. S. Chand and Company Pvt. Ltd., New Delhi. 6. Glick, BR and Pasternak, JJ (2003). Molecular Biotechnology: Principles and Applications of Recombinant DNA. ASM Press, Washington D.C. 7. Griffiths, AJ, Miller, JH, Suzuki, DT, Lewontin, RC and Gelbart, WM (2000). An Introduction to Genetic Analysis. W. H. Freeman, New York. 8. Khushu, S (2019). Molecular Genetics and Biotechnology. ABD Publishers, Jaipur. 9. Klug, WS, Cummings, MR, Spencer, CA and
Week 3 December	15/12/25	20/12/25	02	**Practical 3**: Extraction of DNA from suitable plant material.		Power Point Presentation, Chalk And Board, You Tube Study Videos	
Week 4 December	2/01/26	3/01/26	02	**Practical 4:** Estimation of DNA by diphenylamine method.		Power Point Presentation, Chalk And Board, You Tube Study Videos	
Week 5 January	5/01/26	10/1/26	02	**Practical 5:** Extraction of RNA from plant material.		Power Point Presentation, Chalk And Board, You Tube Study Videos	
Week 6 January	12/01/26	17/1/26	02	**Practical 6 :** Estimation of RNA by Orcinol reagent.		Power Point Presentation, Chalk And Board, You Tube Study Videos	
Week 7 January	19/01/26	24/1/26	02	**Practical 7:** Study of working of restriction enzymes and calculation of the size of fragments generated by use of restriction maps.	.	Power Point Presentation, Chalk And Board, You Tube Study Videos	
Week 8 January	19/01/26	24/1/26	02	**Practical 8:** Study of structures of pBR322, Ti plasmid and cosmid using photographs.		Power Point Presentation, Chalk And Board, You Tube Study Videos	

Week 8 January	27/01/26	31/1/26	02	**Practical 9:** Demonstration of culture of bacteria containing plasmids and maintenance of culture.		Power Point Presentation, Chalk And Board, You Tube Study Videos	Palladino, MA (2017). Concepts of Genetics. 11th edition. Pearson Education, Boston. 10. Kulkarni, VM (2018). Molecular Biology: Concepts and Applications. McGraw-Hill Education, New Delhi. 11. Lewin, B (2019). Genes XII. Jones & Bartlett Learning, Sudbury, MA. 12. Lewin, B, Cassimeris, L, Lingappa, VR, Plopper, G and Sakai, RK (2015). Genes IX. Jones & Bartlett Learning, Sudbury, MA. 13. Lodish, H, Berk, A, Kaiser, CA, Krieger, M, Bretscher, A and Ploegh, H (2015). Molecular Cell Biology. W.H. Freeman, New York.
Week 10 February	9/02/26	14/2/26	02	**Practical 10:** Demonstration of isolation of plasmids.		Power Point Presentation, Chalk And Board, You Tube Study Videos	
Week 11 February	16/02/26	21/2/26	02	**Practical 11:** Demonstration of separation of DNA by gel electrophoresis.	.	Power Point Presentation, Chalk And Board, You Tube Study Videos	
Week 12 February	23/02/26	28/02/26	02	**Practical 12:** Deciphering DNA sequence from a sequencing gel photograph by Sanger and Coulson's method.		Power Point Presentation, Chalk And Board, You Tube Study Videos	
Week 13 February	2/03/26	7/03/26	02	**Practical 13:** Deciphering DNA sequence from a sequencing gel photograph by Maxam and Gilbert's method.		Power Point Presentation, Chalk And Board, You Tube Study Videos	
Week 14 March	9/03/26	14/3/26	02	**Practical 14:** Study of steps of genetic engineering for production of Bt cotton, golden rice, Flavr Savr tomato and humulin using photographs.		Power Point Presentation, Chalk And Board, You Tube Study Videos	
Week 15 March	16/03/26	21/3/26	02	**Practical 15:** Repeating difficult practicals		Power Point Presentation, Chalk And Board, You Tube Study Videos	

Week 16 March	23/03/26	28/3/26	02	**Practical 16:** Journal Corrections and Certification	Journal Corrections and Certification		

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

*** Assessment Rubrics**

Component	**Max Marks**
ISA 1	**7.5**
ISA 2	**7.5**
ISA 3 (Best 2 of 3)	**7.5**
Practical	**NA**
Project	**NA**
Semester End Exam	**80**