ST. ALOYSIUS COLLEGE(AUTONOMOUS), JABALPUR

Reaccredited 'A++ 'Grade by NAAC(CGPA:3.58/4.00)
College with Potential for Excellence by UGC/
DST-FIST Supported & STAR College Scheme by DBT

Theory Paper

Part A Introduction			
Program: Degree	Class: B.Sc.	Semester: VI	Session :2025-26
Subject: Zoology			

1	Course Code	S3-ZOOL2T
2	Course Title	Genetics
3	Course Type (Core Course /Elective/Generic Elective/ Vocational/...)	DSE
4	Pre-requisite (if any)	To study this course, a student must have had the subject Zoology in Diploma.
5	Course Learning Outcome (CLO)	On successful completion of this course, the students will be able to 1. Gain knowledge of basic principles of inheritance and variations, DNA, RNA and their function. 2. Deeper understanding of linkage, Sex determination, Chromosomes, Mutations and mutagens. 3. Gain knowledge of human karyotype, Genome project, Inheritance of blood group and genetic diseases in human. 4. Demonstrate gene therapy, PCR, DNA fingerprinting techniques and their application. 5. Find Job Opportunities in Hospitals, Pharmaceutical Companies and other health services, Forensic Science Research Associates, Genetic Counselor, Clinical Research Associate, Animal Breeder, Genetic Laboratory Technician
6	Credit Value	3
7	Total Marks	Max. Marks : 40+60 / Min. Passing Marks - 35

Part B- Content of the Course

Total No. of Lectures – Tutorials – Practical (2 hour per week): L-T-P: 30

Unit	Topic	No. of Lectures
I	**Overview of Genetics** 1. Introduction and Historical background of genetics 2. Definition, Scope and Importance of Genetics 3. Chromosomes: Transmitters of Heredity 3.1. Structure and Organization of Chromosomes ighe 3.2. Types of Chromosomes 3.3. Chemical composition of chromosomes 4. Nucleocytoplasmic Interaction 5. Mendel's laws of Heredity 6. Variations: Types and genetic basis of Variations on **Keywords: Heredity, Chromosome, Variation, Genetics, Nucleocytoplasmic Interaction**	10
II	**Gene and Genetic Material** 1. Chemistry of Gene - Nucleic acids and their structure 2. Concept of DNA replication 3. Nucleosome (Solenoid Model) 4. Types of genes: Split genes, Overlapping genes and Pseudogenes 5. Genetic code **Keywords: Nucleic acids, DNA replication, Nucleosome, Pseudogenes, Split genes, Genetic code**	10
III	**Linkage and Chromosomal Aberrations** 1. Gene linkage and recombination 2. Sex-determination. 3. Sex-linked Inheritance 4. Structural changes in chromosomes: Deficiency, Duplication, Translocation and Inversion 5. Numerical changes in chromosomes: Aneuploidy, Polyploidy 6. Mutation: Types of mutations and mutagens **Keywords - Linkage, Recombination, Sex-determination, Sex-linked Inheritance, Mutation, Mutagens, Polyploidy**	10
IV	**Human Genetics& Genetic Engineering** 1. Human chromosomes: Human Karyotype and Human Genome Project 2. Common genetic disorders 3. Multiple factors and blood groups. 4. Twins: Fraternal, Maternal and Siamese twins 5. Transgenic and knockout animals and their applications 6. Gene Therapy: - Germline, and Somatic cell gene therapy. 7. Recombinant DNA technology, Gene cloning, Gene library, PCR and Hybridization techniques 8. DNA finger printing **Keywords: Karyotype, Genetic disorders, Transgenic, Knockout animals**	15

23/8/25

Part –D: Assessment & Evaluation (Practical)

Suggested Continuous Evaluation Methods:

S.No.	Internal Assessment	Marks	External Assessment	Marks
1.	Class interaction/Quiz	40	Viva Voce on Practical	60
2	Attendance		Practical Record File	
3	Assignments (Charts/Model) Seminar/Rural Service/ Technology Dissemination/ Report of Excursion/Lab Visits Survey/Industrial Visit		Table work/Experiments	
			Total	**100**

Remark: