



# 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)	<p>On successful completion of this course, the students will be able to</p> <ol style="list-style-type: none"><li>1. Gain knowledge of basic principles of inheritance and variations, DNA, RNA and their function.</li><li>2. Deeper understanding of linkage, Sex determination, Chromosomes, Mutations and mutagens.</li><li>3. Gain knowledge of human karyotype, Genome project, Inheritance of blood group and genetic diseases in human.</li><li>4. Demonstrate gene therapy, PCR, DNA fingerprinting techniques and their application.</li><li>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</li></ol>	
6	Credit Value	3	
7	Total Marks	Max. Marks : 40+60	Min. Passing Marks - 35


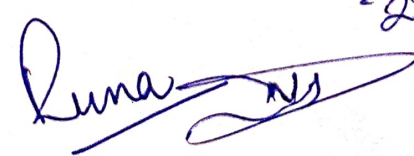
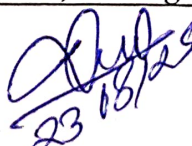



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Part B- Content of the Course		
Total No. of Lectures – Tutorials – Practical (2 hour per week): L-T-P: 30		No. of Lectures
Unit	Topic	
I	<b>Overview of Genetics</b> 1. Introduction and Historical background of genetics 2. Definition, Scope and Importance of Genetics 3. Chromosomes: Transmitters of Heredity 3.1. Structure and Organization of Chromosomes 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  <b>Keywords: Heredity, Chromosome, Variation, Genetics, Nucleocytoplasmic Interaction</b>	10
II	<b>Gene and Genetic Material</b> 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  <b>Keywords: Nucleic acids, DNA replication, Nucleosome, Pseudogenes, Split genes, Genetic code</b>	10
III	<b>Linkage and Chromosomal Aberrations</b> 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  <b>Keywords - Linkage, Recombination, Sex-determination, Sex-linked Inheritance, Mutation, Mutagens, Polyploidy</b>	10
IV	<b>Human Genetics &amp; Genetic Engineering</b> 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 <b>Keywords: Karyotype, Genetic disorders, Transgenic, Knockout animals</b>	15



## 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	
			<b>Total</b>	<b>100</b>

Remark:

