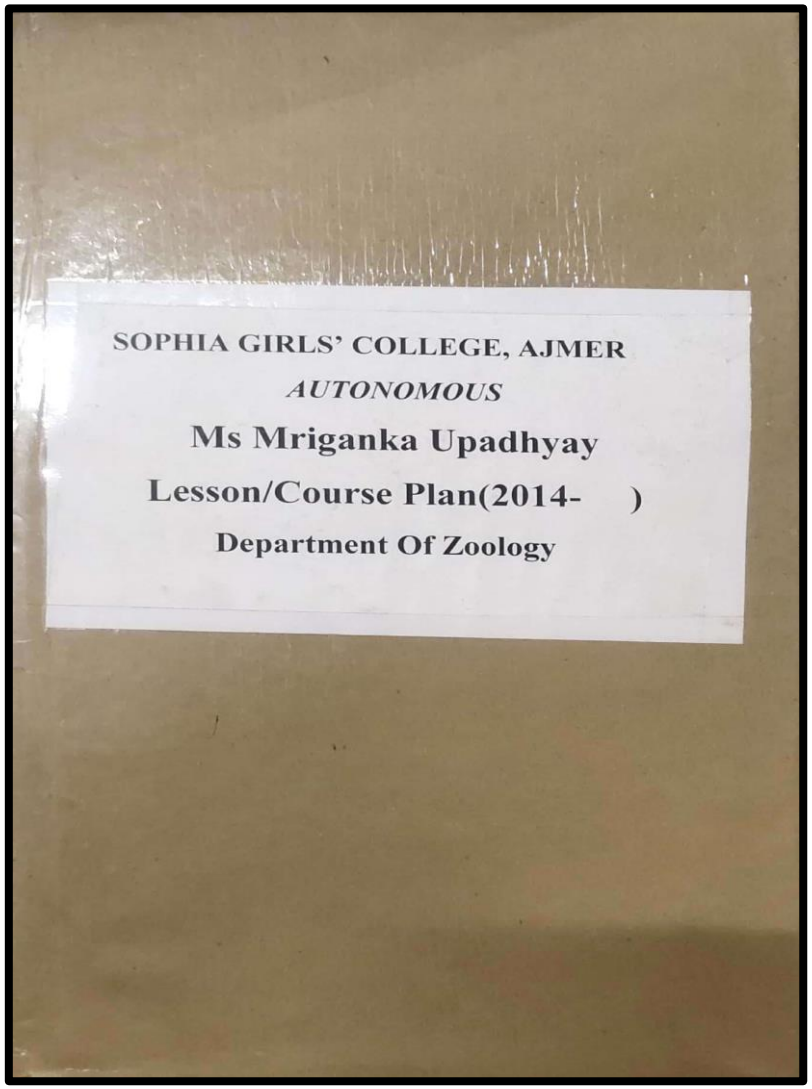
SOPHIA GIRLS' COLLEGE(AUTONOMOUS), AJMER



COURSE_PLAN_2020-21_MRS_MRIGANKA_UPADHYAY

COURSE PLAN

B.Sc (Bio) Odd Semesters

Mriganka Upadhyay
Department Of Zoology
Session 2020-21

SOPHIA GIRL'S COLLEGE, AJMER (*AUTONOMOUS*)

B.Sc. II (SEMESTER III)

Classification, Structure and Special Features of Chordates (PAPER I) (ZOO 301)

Max. Marks : 75 (50Ext; 25 Int) Min. Marks: 30(20 Ext;10 Int) Credit: 03

COURSE PLAN

SEM I Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
JULY-AUGUST	**UNIT I** Classification and characters of phylum **chordata** (excluding extinct forms) up to classes (up to subclass in mammals).	Three basic Chordate characters and other characteristics of Chordates along with the key identifying characters of other phyla included in chordates and classification upto class . (up to subclass in mammals).	Lecture presentation ,E-content and group discussion	Describe unique characters of Fishes, Amphibians, Reptiles, Aves and Mammals, urochordates, cephalochordate and their affinities,	*Knowledge Based* - What are the basic Chordate characters -List the characters of Aves *Understanding Based* - Explain the Blood Vascular system in Herdmania - Analyze the characters of	Knowledge--50 Understanding-35 Higher Order-15
	Habit, habitat, external features and anatomy of	Detailed study if the characteristics of				

	Herdmania (excluding development)	Herdmania and its various systems	Blended learning, links for audio & video lectures		Ascidian tadpole larva *Higher Order* - Justify Retrogressive Metamorhosis - Differentiate between Venomous and Non venomous snakes	
	Ascidian's tadpole larva and its Metamorphosis, Salient Features of **Hemichordata**	The significance of the Ascidian tadpole larva Familiarize with the basic features of Hemichordates	Lecture presentation and group discussion, Assignment			
SEPTEMBER	**UNIT II** Habit, habitat, external features and anatomy of ***Branchiostoma*** *(*excluding development)	Detailled study of Branchiostoma	Lecture presentation and quiz	Analyze the ecological role and special features of different groups of chordates.		

	Habit, Habitat and Salient features of ***Petromyzon*** and **Ammocoete larva**	Importance of Ammocoete larva and the salient features of Petromyzon	PPT			
	Pisces – Scales and fins, Migration, Receptor Organs (Lateral line system and Electric Organ) **Amphibia** - Parental care	Parental care as special feature in Amphibians and an insight on various types of fins and scales in Pisces and the basic receptor organs present in Fishes.	Power point Presentation and video links			
OCTOBER - NOVEMBER	**UNIT III** **Reptilia** – Venomous and non-venomous snakes, Poison apparatus / venom gland	Special features of class Reptilia and to distinguish between venomous and non venomous snakes and the biting mechanism in detail	Lecture Presentations and Group discussions	Summarize the special features of Reptiles ,Aves and Mammals		

	Aves - Flight adaptation, Bird migration **Mammals** - Adaptive radiation, Dentition, Echolocation in Bats	Important features of Aves and Mammalia	Audio and video lecture links and quiz			

Sr. Pearl

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(AUTONOMOUS)
AJMER

Head
Department of Zoology
Sophia Girls' College
(Autonomous), Ajmer

B.Sc. II (SEMESTER III)

Comparative Anatomy of Chordates (PAPER II) (ZOO-302)

Max. Marks : 75 (50Ext; 25 Int)

Min. Marks: 30(20 Ext;10 Int)

Credit: 03

COURSE PLAN

SEM III Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
JULY-AUGUST	UNIT I Comparative study of **Pisces, Amphibians, Reptiles, Aves and Mammals.** Integument including structure and development of placoid scales, feathers and hair	Comparative account of the Integumentary system and its derivatives in Amphibians Rreptiles,Aves and Mammals	Lecture cum demonstration, models and brainstorming	Identify and provide a basic description of how major vertebrate systems function.	*Knowledge Based* -What is Integument -Recall and Explain any 4 integumentary	Knowledge--50 Understanding-35 Higher Order-15
	Alimentary canal	Comparative digestive system of the major vertebrate phyla and its correlation with diet	Lecture Presentation and group discussion			

SEPTEMBER-OCTOBER	UNIT II Basic plan of vertebrate endoskeleton.	Comparative account of the endoskeleton found in the major vertebrate phyla	Demonstration and Lecture Presentation	Correlate morphology to its function, especially with respect to the adaptive significance of particular structures and organ systems.	derivatives *Understanding Based* -Compare the Pelvic Girdles in various phyla -analyze the plan of respiratory system in Aves *Higher Order Thinking Skills Based* -Assess the evolution of Brain in various phyla -Appraise the Structure of
	Heart and aortic arches	Understand the evolution of heart and aortic arches in various phyla	Lecture Presentation and video links		
	Respiratory system	Examine the differences in respiratory mechanisms accordin to the environment	PPT Lecture and links of E-content		
NOVEMBER	UNIT III Excretory system ,	Understand the evolution and differences in the urinogenital System in various phyla	Guest Lecture, Lecture Presentation and Group Discussion	Compare and discriminate the anatomical systems of different vertebrates and identify common traits across species	
	Reproductive system	Understand the evolution and differences in the urinogenital System in			

		various phyla		and/or groups.	Aortic Arches in chordate phyla	
	Brain	Understand the changes which took place in the structure of brain and how it gradually evolved in mammals	Lecture Presentation and Quiz			

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AJMER

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Department of Zoology
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B.Sc. III (SEMESTER V)

Molecular Biology (PAPER I) (ZOO 501)

Max. Marks : 75 (50Ext; 25 Int) Min. Marks: 30(20 Ext;10 Int) Credit: 03

COURSE PLAN

SEM V Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
JULY-AUGUST	UNIT I **DNA** Structure, polymorphism (**A, B and Z type**)	Basic Structure of DNA and its polymorphic forms ie its types	Lecture Presentation, video links of animations of structure and replication , and quiz	Review how DNA encodes genetic information ,its polymorphic forms and the role of various enzymes related to stability and replication of DNA .	*Knowledge Based* - Recall the structure of B-DNA in detail *Understanding Based* - Explain the mechanism of Replication in	Knowledge--40
	Replication in Eukaryotes (semi-conservative mechanism), elementary idea about polymerases, topoisomerases, single strand binding protein, replication forks(Both unidirectional and bidirectional), leading and lagging strands, RNA primers and Okazaki fragments.	Process of Replication in detail with the major enzymes involved during the entire process				

					detail Analyze the process of Replication in detail *Higher Order* - Discuss the Process of Transcription in detail .Illustrate your answer with suitable diagrams	Understanding-35 Higher Order-25
SEPTEMBER-OCTOBER	**Unit – II.** **RNA** structure and types **(mRNA, rRNA and tRNA)**	To understand the basic structure of RNA and its types and their functions	Presentation, Video animations, pdf notes ,link of material, group discussions	To Explain the mechanisms associated with Gene expression at the level of Transcription and Translation		
	Genetic Code: Triplet Codon, Code Characteristics-Degeneracy and Wobble Hypothesis	To understand the				

	Transcription: Prokaryotic and Eukaryotic mechanism of transcription (elementary idea about polymerases, capping, poly A tail, exon and introns).	properties of Genetic code in detail and the mechanism of Transcription in detail				
NOVEMBER	**UNIT III** **Translation:** (excluding Post Translational Modification)	To understand the process of Translation in detail	Presentation ,video lectures,quiz and links of text material from epg pathshala	Summarize and explain the events involved in DNA repair mechanisms		
	DNA Repair Mechanisms: Pyrimidine dimerization and mismatch repair	Understand the DNA errors and the repair mechanisms involved				

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(AUTONOMOUS)
AJMER

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Department of Zoology
Sophia Girls' College
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COURSE PLAN

B.Sc (Bio) Even Semesters

Mriganka Upadhyay
Department Of Zoology
Session 2020-21

SOPHIA GIRL'S COLLEGE, AJMER (*AUTONOMOUS*)
B.Sc. I (SEMESTER II)

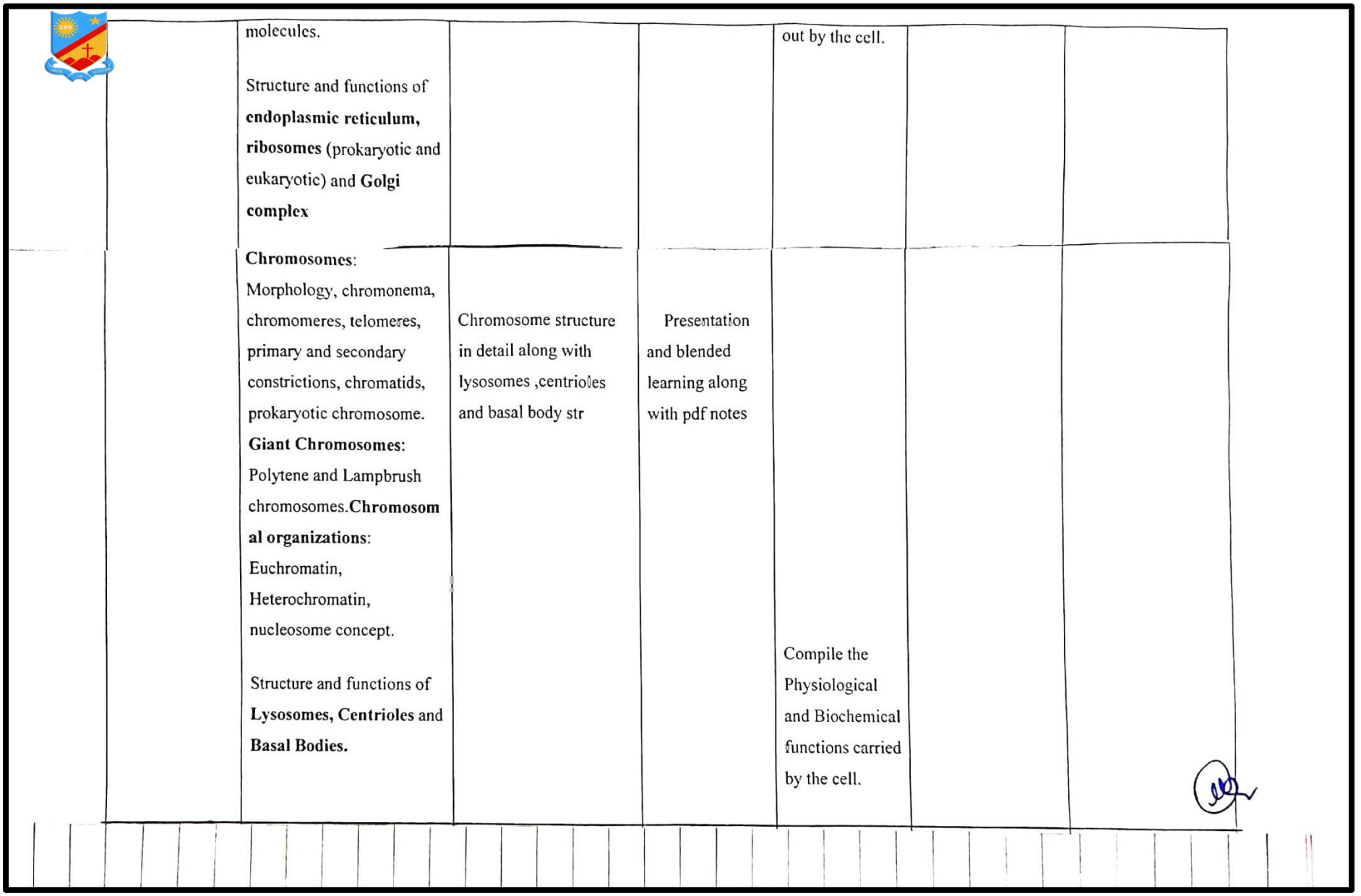
Cell Biology (PAPER I) (ZOO 201)

Max. Marks : 75 (50Ext; 25 Int) Min. Marks: 30(20 Ext;10 Int) Credit: 03

COURSE PLAN

SEM III Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
APRIL-MAY	**Unit - I** **Introduction to Cell:** Morphology, size, shape and characteristics of Prokaryotic, Eukaryotic Cell (animal cell). Basic idea of Virus and Cell Theory .Elementary idea of the structure of Corona Virus **Cell-membrane:** Characteristics of cell	Basic structure of animal cell and distinguish between Pro and Eukaryotic cell ,elementary idea of virus and cell theory and understand the structure of biomembranes and the basic str of Corona Virus	Blended Learning(Links of audio & video tutorials) Quiz and Group Discussion & Brainstorming	Infer the basic structure of the cell and the various organelles,its membranes and str of Corona virus	*Knowledge Based* - List the differences between a Pro and Eukaryotic Cell *Understanding Based* - Demonstrate the animal cell in detail with the help of a well labelled	Knowledge--60 Understanding-30 Higher Order-10

	membrane molecules, Concept of unit membrane. **Fluid-mosaic model** of Singer and Nicolson.				diagram - Analyze the Fluid Mosaic Model in detail *Higher Order*	
	Cell-membrane transport: Passive (diffusion and osmosis) and active transport. Structure and functions of **cilia, flagella .**	Understand the basic properties an functions of biomembrane and understandthe structure and functions of various cell organelles like cilia and flagella	E content , Lecture Presentation, Brainstorming and quiz		- Interpret Active transport in animal cell - Distinguish between Cilia and Flagella	
MAY-JUNE	**Unit – II** Structure and biogenesis of **mitochondria**; electron transport chain and generation of ATP	Understand the str and functions of Mitochondria ,ER,Ribosomes and Golgi Complex	Presentation, video lectures and mcqs	Discover the fundamental functions carried		



	molecules. Structure and functions of **endoplasmic reticulum, ribosomes** (prokaryotic and eukaryotic) and **Golgi complex**			out by the cell.		
	Chromosomes: Morphology, chromonema, chromomeres, telomeres, primary and secondary constrictions, chromatids, prokaryotic chromosome. **Giant Chromosomes:** Polytene and Lampbrush chromosomes.**Chromosomal organizations**: Euchromatin, Heterochromatin, nucleosome concept. Structure and functions of **Lysosomes, Centrioles** and **Basal Bodies.**	Chromosome structure in detail along with lysosomes ,centrioles and basal body str	Presentation and blended learning along with pdf notes	Compile the Physiological and Biochemical functions carried by the cell.		

JULY-AUGUST	**Unit – III** **Nucleus**: Structure and function of nuclear envelope, nuclear matrix and nucleolus. **Cell reproduction:** **Interphase** nucleus and cell cycle(S, G-1, G-2 M-phase). **Mitosis**: Phases and process of mitosis, structure and function of spindle apparatus, anaphasic movement. **Meiosis**: Phases and process of meiosis, synapses and synaptonemal complex, formation and fate of chiasmata and significance of crossing over	Detailed structure of Nucleus ,Cell cycle and various stages of Mitosis and Meiosis	Presentation, Student conceived Projects and Assignment			

Sr. Pearl
PRINCIPAL
SOPHIA GIRLS' COLLEGE
(AUTONOMOUS)

Head
Department of Zoology
Sophia Girls' College

B.Sc. I (SEMESTER II)

Developmental Biology (PAPER II) (ZOO-202)

Max. Marks : 75 (50Ext; 25 Int)

Min. Marks: 30(20 Ext;10 Int)

Credit: 03

COURSE PLAN

SEM III Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
APRIL -MAY	**Unit - I** **Gametogenesis**: Spermatogenesis and Oogenesis Types of eggs (alecithal, microlecithal, mesilecithal, megalecithal, Isolecithal, Telolecithal) Vitellogenesis **Fertilization**: Activation of ovum, changes in the organization of the egg cytoplasm.	Understand the basics of developmental Biology .Review gametogenesis and Fertilization in detail	Lecture presentation, audio tutorial,group discussion	Review the events that lead up to fertilization	*Knowledge Based* -What is Oogenesis -Recall and Explain the	Knowledge--60 Understanding-30 Higher Order-10

	Unit – II **Cleavage**: Definition, types of cleavage (holoblastic, merblastic), planes (meridonal, vertical, equatorial, latitudinal) and patterns (determinate and indeterminate). Significance of cleavage, morulation and blastulation.				events involved in Fertilization *Understanding Based* -Differentiate between spermatogenesis and oogenesis -analyze the process of Gastrulation	
MAY -JUNE	**UNIT II** **Gastrulation**: definition, fate maps, morphogenetic cell movements, significance of gastrulation. .	Have the basic understanding of the gastrulatio and various morphogenetic movements	Video and audio presentation and links of study material	Analyze the stages and cellular mechanisms for gastrulation. & attain a basic	*Higher Order Thinking Skills Based* -Assess the modes of regeneration sin animals -Appraise the Placentation in	
	Regeneration Types- Morphollaxis and Epimorphic	Basic types of regeneration modes in	Presentation Discussion &			

	regeneration, regeneration abilities in different animals. Amphibian limb regeneration	various animal phyla	quiz	conceptual knowledge of mechanisms of regeneration .	Mammals	
JULY-AUGUST	**Unit – III** **Embryonic adaptations-** elementary idea of cleidoic egg. Extra-embryonic membranes in chick. **Placentation in Mammals:** Definition, types, classification on the basis of morphology and histology, functions of placenta Elementary idea about **Xenobiotics**, teratological effects of Xenobiotics. **Stem Cells:** Types and their importance. (Elementary idea). ,	Understand the Placentation in mammals and have an elementary idea of Xenobiotics and Stemcells and their uses	PPT Lecture Charts	Able to summarize implications of development and the mechanisms that intervene in developmental alterations and elementary idea of Stem Cells .		

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(AUTONOMOUS)
AJMER

Head
Department of Zoology
Sophia Girls' College
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B.Sc. III (SEMESTER VI)

Immunology& Biotechnology (PAPER I) (ZOO 601)

Max. Marks : 75 (50Ext; 25 Int) Min. Marks: 30(20 Ext;10 Int) Credit: 03

COURSE PLAN

SEM V Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
FEBRUARY	**UNIT I** **Immunology**: Definition, types of immunity, innate and acquired, humoral and cell mediated.	Basic idea of the Types Of Immunity& Cells of immune System	Lecture Presentation, audio and video links Brainstorming & Group discussion	Enumerate the role of different cells, effector molecules and effector mechanisms in Immunology and understand the principles	*Knowledge Based* -Recall the Types Of immunity and Discuss the basic structure of an Antibody *Understanding*	

	Structure of Antibodies Structure of different classes of Antibodies Hinge region, Light chain, heavy chain Proteolytic cleavage of antibody by papain and pepsin.			underlying various Immunotechniques	*Based* Compare the structure of various Immunoglobulins with special emphasis on their Biological properties *Higher Order* - Evaluate the Importance of Antigen antibody reaction and discuss ELISA in detail	Knowledge--40 Understanding-35 Higher Order-25
	Cells and Molecules of the immune system. Phagocytes, Basophils, Eosinophils, Mast cells, dendritic cells, T cells, B cells, Neutrophils. Interleukins, Interferon's, Growth factors.					
	Antigen – Antibody interactions: Precipitation reaction– Radial					
	immunodiffusion; Agglutination reaction–ELISA					

MARCH	**UNIT II** **Recombinant DNA** technologies and its application: Elementary idea **Vectors** for gene transfer (plasmids and phages). Basic concepts of cell and tissue culture, **Hybridoma** technology ,	Basic protocol of recombinant DNA technology &its applications	Lecture Presentations , quiz ,audio video links ,Blended learning	Analyze the steps involved in rDNA technology,hbridomas .M.C.As and P.C.R		
JUNE -JULY	**UNIT III** **Monoclonal antibodies, P.C.R** and their applications **Transgenic animals** and their uses in biotechnology. Brief account of **cloning**; (i) Nuclear transfer techniques (ii) Cloning, mechanism and applications	Cloning and Transgenic animals and the ethical issues related to it	Lecture presentation, group discussion. Audi and video links	Appraise the significance of transgenic animal models, the principles and applications of animal cloning along with its ethical issues		

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Department of Zoology
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