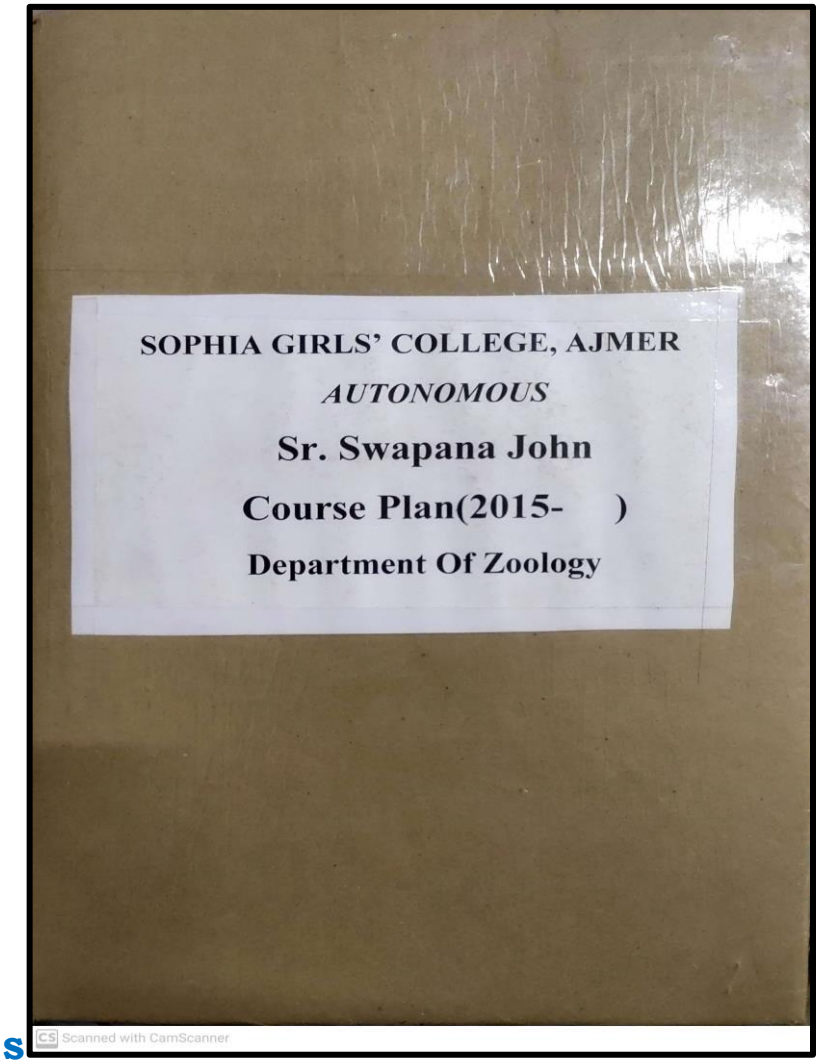
SOPHIA GIRLS' COLLEGE(AUTONOMOUS), AJMER



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COURSE PLAN

B.Sc. (Bio)Odd Semester

2022-23

Sr Swapana John

Assistant Professor

Department of Zoology

SOPHIA GIRLS' COLLEGE, AJMER (*AUTONOMOUS*)
B.Sc. I (SEMESTER I) Odd Semester Course Plan for the Session 2022-23

PAPER I -ZOO-101- Invertebrates: Classification and Special Features

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

COURSE PLAN

Semester/ Month	Unit/Topic	Concepts/ Facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
Semester-I August	**UNIT I** 1. **Invertebrate Classification:** Salient features of various phyla and their classification upto Classes: Protozoa, Porifera, Coelenterata, Aschelminthes, Platyhelminthes, Annelida, Arthropoda, Mollusca, Echinodermates. 2. **General principles of taxonomy** - concept of the Five Kingdom scheme. 3. **Concept of Protozoa, Parazoa, Metazoa,**	1.Basis or Foundation for Classification of Invertebrates 2. concept of Parazoa, Metazoa and Eumetazoa	1. Traditional and blended teaching. Use of flipped classroom. 2. PowerPoint Presentations 3. Live Videos 4. Mindmap and Infographics 5. Live observation of	1.Classify Invertebrate phyla demonstrating its characters upto class.	***Knowledge Based*** 1.Give 4 characters of the phylum Platyhelminthes. 2. Classify the Phylum Porifera up to classes. ***Understanding Based*** 1.Explain the primary and secondary symmetry. 2. Compare Parazoa and Metazoa	*Knowledge Based Questions*- 60% weightage. *Understanding Based Questions* -30 weightage. *Higher Order Based Questions* -10 weightage.

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	Eumetazoa and levels of organization. 4. **Basis of classification of non-chordata**: Symmetry, coelom, segmentation and embryogeny.	3.Levels of organization in increasing order of complexity	invertebrates- in campus and water sources 6. Content Management System via Moodle	2. Concept of evolution of complexity from Protozoa to Eumetazoa. 3.Grades of organization for classification.	***Higher Order Thinking Skill*** 1.Critically Evaluate the concepts of Coelom giving example. 2. General Character are followed by Specific Character's-justify the statement based on the various level of organisation in Invertebrates.	

Semester/ Month	Unit/Topic	Concepts/ Facts	Teaching Pedagogy	Learning Outcomes	Questions
Semester-I **September**	UNIT II 1. **Protozoa**: Reproduction and Mode of locomotion: Cilia, Flagella and pseudopodia.	1. Various modes evolved for asexual and sexual reproduction. 2.Concept of Endoskeleton and Canal	1. Traditional and blended teaching. Use of flipped classroom.	1.Specific adaptation present in the invertebrates for its survival and sustenance.	***Knowledge Based*** 1.What is sol-gel theory. 2. Write a note on the various types of Asexual reproduction found in the Phylum Protozoa. ***Understanding Based*** *1.Explain the development of spicules in Porifera.*

	2. **Porifera**: Spicules: calcareous, silicious. Canal system: Ascon, Sycon and Leucon type. 3. **Coelenterata:** Polymorphism, Corals and Coral reefs. 4. **Platyhelminthes:** Parasitic adaptations: Morphological and Physiological. 5. **Aschelminthes:** Life cycle with reference to Ascaris and its Economic Importance	system and its complexities. 3.Polymorphism and its adaptation for survival.	2. PowerPoint Presentations using CANVA 3. Quiz on Kahoot 4. Chart Display 5. Problem solving session 6. Group Discussion	2. Overview of various modes of survival present in different phyla depending upon their lifestyle.	2. Illustrate on Coral and Coral Reef ***Higher Order Thinking Skill*** 1.Critically Evaluate the complexity of canal system from Ascon to Leucon type. 2. Invertebrates adapt morphologically and physiologically to live in anaerobic and adverse conditions. Justify the statement with respect to Platyhelminthes.

Semester/ Month	Unit/Topic	Concepts/ Facts	Teaching Pedagogy	Learning Outcomes	Questions
Semester-I	**UNIT III** 1. **Annelida:** Reproduction with reference to Earthworm. Locomotion: Setae and Parapodia.	1. Higher Invertebrates and their specific	1.Traditional and blended teaching. Use of flipped classroom.	1. Compare and analyze the different special features present	***Knowledge Based*** 1.What is the purpose of setae and parapodia 2. Write a note on the reproduction process in Annelida.

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October-November	2. **Arthropoda:** Metamorphosis: Ametabolous, Hemimetabolous and Holometabolous. Social organization in Termites and Bees :Life Cycle, Caste System and its Economic Importance 3. **Mollusca:** Foot and shells, Torsion with reference to *Pila* 4. **Echinodermata:** Water vascular system and its function	adaptation and characters. 2.Mollusca and torsion and its impact on the animal. 3.Complex evolution of water vascular system for locomotion.	2.Presentations using CANVA. 3. Youtube videos 4. Group Discussion 5. Filed Survey to identify the various Arthropods 6. **FORMATIVE ASSESSMENT** via quiz on Kahoot, internal assessment, oral and written test 7. Personalised teaching on slow and advanced learners via peer to peer learning and differentiated instructions.	in different phylum 2. Understand the division of labor and social system prevalent in the Social Insects	***Understanding Based*** 1.Explain the process of torsion in *Pila.* 2. Illustrate on Water Vascular System found in Echinodermata. ***Higher Order Thinking Skill*** 1.Critically Evaluate the complexity of the division of labour found in Honey Bees. 2. Analyse the role of locomotion performed by the water vascular system in Starfish.
SUMMATIVE ASSESSMENT- End Semester Examination and Practical's in December					

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B.Sc. I (SEMESTER I) Odd Semester Course Plan for the Session 2022-23

PAPER II- ZOO-102 Structure And Function Of Invertebrates

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

COURSE PLAN

Semester/ Month	Unit/Topic	Concepts/ facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
Semester-I **August**	**UNIT I** 1. **Skeleton:** Endoskeleton (spicules of *Sycon)*and Exoskeleton of *Palaemon.* 2. **Food, Feeding, Digestive** structures and Digestion: Autotrophic *(Euglena),* heterotrophic- through food vacuole	1.Basic concept of skeleton 2.Basic concept of nutrition	1.Traditional and blended teaching. Use of flipped classroom. 2.PowerPoint Presentations using Canva 3. Live Videos 4.Quiz on Kahoot	1. Describe the basic structures of the different invertebrate phyla. 2.To understand the complexity of feeding and	***Knowledge Based*** 1.Give difference between exoskeleton and endoskeleton with example. 2. Define mixotrophic nutrition with example. ***Understanding Based*** 1.Explain the Development of Spicules. 2. Compare the mode of nutrition in *Paramecium* and *Taenia*	*Knowledge Based Questions-* 60% weightage. *Understanding Based Questions* -30 weightage. *Higher Order Based Questions* -10 weightage.

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	(Paramecium) and in hydroid and medusoid zooids (*Obelia)*, parasitic, (*Taenia, Hirudinaria),* predatory (*Palaemon,)*		5. Group Presentation using PPT	organs involved in various phylum	***Higher Order Thinking Skill*** 1.Critically Evaluate the concepts of Mixotrophic nutrition with reference to Euglena. 2. Hirudinaria feed on blood- justify the statement based on its nutrition.	

SEM Month	UNIT/TOPIC	Concepts/ facts	Teaching Pedagogy	Learning Outcomes	Questions
Semester-I **September**	**UNIT II** 1. **Respiration:** Anaerobic (Fasciola), parapodia (*Nereis*), Aquatic general body surface (*Pheretima*), trachea (Insect). gills (*Pila),*	1. Evolution in the mode of respiration. 2.Concept of evolution of the	1.Traditional and blended teaching. Use of flipped classroom. 2.PowerPoint Presentations using CANVA	1. Describe the basic structures of the different invertebrate phyla. 2. To comprehend co-ordination and working of the sense organs and nervous	***Knowledge Based*** 1.What is anaerobia and aerobic respiration? 2. Draw a well labelled diagram of the nervous system of *Pila.* ***Understanding Based***

	aerial, pulmonary sac *(Pila)*, dermal branchiae (*Asterias).* 2. **Nervous System:** Sensory and nerve cells *(Obelia)*; brain ring and longitudinal nerves (*Fasciola*), brain and ventral nerve cord (*Palaemon*), nervous system of *Pila.* 3. **Sense-organs:** simple eye and nuchal organs (*Nereis),* tactile, olfactory organs and compound eye (*Palaemon*) and Statocyst and osphradium(*Pila*).	complexity of Nervous System. 3.Various sense organs and its functioning.	3. Quiz on Kahoot 4.youtube videos 5. Microscopic slides 6. Group Discussion 7.Display of charts 8. Video classes on OBS	system for the survival.	1.Explain the complexity of vision in *Palaemon* with respect to its Compound eyes. 2. Illustrate a note on statocysts. ***Higher Order Thinking Skill*** 1.Critically Evaluate the complexity of respiration in *Pila* in land and water. 2. *Pila* has a combination of commissures and connectives. Justify the statement with respect to the nervous system of *Pila.*

Semester/ Month	Unit/Topic	Concepts/ facts	Teaching Pedagogy	Learning Outcomes	Questions
Semester-I **October-November**	**UNIT III** **1. Circulation:** Cyclosis (Paramecium), diffusion (*Sycon, Taenia*), open circulatory system *(Palaemon)*, closed circulatory system *(Nereis)*. **2. Excretion:** General body surface (*Paramecium*), protonephridial system and flame cells (*Fasciola*), nephridia *(Pheretima)*, malpighian tubules (insect), organ of Bojanus (*Pila*). **3. Reproduction:** Asexual (*Paramecium,*	1. An understanding on the open and closed circulatory system. 2.To see the evolution and complexity in the process of excretion. 3.The various mode of reproduction.	1.Traditional and blended teaching. Use of flipped classroom. 2.PowerPoint Presentations using CANVA 3. Youtube videos 4. **FORMATIVE ASSESSMENT** via quiz on Kahoot, internal assessment, oral and written Class tests, GD. 5. **Content management system** vi a MOODLE 6. **Personalised teaching Learning** – remedial classes, pair and think and share	1. Compare and analyze the different special features present in different phylum 2. Understand the concept of excretion and its evolution in the invertebrates.	***Knowledge Based*** 1.What is cyclosis? 2. Write a note on flame cells. ***Understanding Based*** 1.Explain the process of circulation in *Nereis.* 2. Illustrate on organ of Bojanus. ***Higher Order Thinking Skill*** 1.Critically Evaluate the complexity of respiratory system with a special emphasis on *Palaemon.*

	Sycon), alternation of generation (*Obelia*), sexual (*Fasciola, Neries*)				2. *Obelia* has a lifecycle including an alternative diploid and haploid stage. Justify the statement with reference to alternation of generation in *Obelia*.
SUMMATIVE ASSESSMENT- End Semester Examination and practical's in December					

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SOPHIA GIRL'S COLLEGE, AJMER (*AUTONOMOUS*)
B.Sc. III (SEMESTER V) Odd Semester Course Plan for the Session 2022-23

ZOOLOGY -PAPER II ZOO-502-Biochemistry and Ethology

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

COURSE PLAN

Semester/ Month	Unit/Topic	Concepts/ facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
SemesterV **July**	**UNIT I** **1. Introduction and history of Ethology.** (Karl Von Frisch, K. Lorenz, N. Tinbergen). **2. Concepts of Ethology:** fixed action pattern, sign stimulus, motivation,	1. To know the background and history and contributions of the various Ethologists 2.To understand the various terminologies. 3.To understand the connection and links with	1.Traditional and blended teaching. Use of flipped classroom. 2.PowerPoint Presentations using CANVA 3.Recorded Videos 4. YouTube videos 5. Experiential Learning via visits.	1.Speculate animal strategies and interactions. 2.Formulate the importance of behaviour for survival.	***Knowledge Based*** 1.Write a note on Karl Von Frish. 2. What is FAP? ***Understanding Based*** 1.Explain Imprinting 2. Illustrate difference between	***Knowledge Based Questions-*** 60% weightage. ***Understanding Based Questions*** -30 weightage. ***Higher Order Based***

	imprinting and learning. 3. **Methods of studying behaviour:** Neuroanatomical neurophysiological, neurochemical techniques.	respect to various behaviours and working of the brain.	6. **FORMATIVE ASSESSMENT** via quiz on Kahoot, internal assessment, oral and written Class tests, GD, Presentation. 7. **Content management system** via MOODLE 8. **Personalised teaching Learning** – peer tutoring, pair and share.		innate learning and learning. ***Higher Order Thinking Skills*** 1.Critically Evaluate the complexity of brain with reference to its role in neurochemical ways to study behaviour. 2. Justify that the critical period has an important role to play in the behaviour of an organism.	*Questions* -10 weightage.

Semester/ Month	Unit/Topic	Concepts/ facts	Teaching Pedagogy	Learning Outcomes	Questions
Semester V **August**	1. **Territory and Home range**- Role of pheromones. 2. **Social behaviour:** Characteristics and advantages of social grouping with special reference to monkey and primates.	1. To have an understanding of their habitat and their living based on pheromones 2.To know the social boundaries and working in the social grouping animals.	1.Traditional and blended teaching. Use of flipped classroom. 2.PowerPoint Presentations using CANVA 3.Recorded Videos 4. YouTube videos	1.Speculate animal strategies and interactions. 2.Formulate the importance of behavior for survival with a special reference on pheromones.	***Knowledge Based*** 1.Write a note on home range? 2. What is trail pheromones? ***Understanding Based*** 1.Explain social grouping in monkey. 2. Illustrate difference between primer effect and releaser effect. ***Higher Order Thinking Skill*** 1.Critically Evaluate the working of a sex attractants and an alarm pheromone. 2. Justify that monkeys are perfect social grouping animals.

Semester/ Month	Unit/Topic	Concepts/ Facts	Teaching Pedagogy	Learning Outcomes	Questions
Semester **V** **September**	**UNIT II** 1. **Carbohydrates-** Structure, function and significance. Oxidation of Glucose through Glycolysis, Kreb Cycle and Oxidative Phosphorylation. 2. **Lipis:** Basic Structure, function and significance. Beta Oxidation.	1. To understand the building blocks that make the compounds. 2. To know the various bonds that partake in their formation. 3. To have an idea of their metabolism.	1.Traditional and blended teaching. Use of flipped classroom. 2.PowerPoint Presentations using CANVA 3.CMap. 4. YouTube videos	1. To have an understanding of the various components used in Biochemistry. 2. To integrate Biochemistry and their application.	***Knowledge Based*** 1.Write a note on disaccharides. 2. What is beta oxidation ***Understanding Based*** 1.Explain the structure and functions of Lipids. 2. Illustrate the conversion of Acetyl Co A into Carbon dioxide through Kreb Cycle. ***Higher Order Thinking Skill*** 1.Critically Evaluate the most primitive and conserved pathway of metabolism of glucose. 2. Justify that Aerobic respiration generate more ATP than Anaerobic respiration.

Semester/ Month	Unit/Topic	Concepts/ Facts	Teaching Pedagogy	Learning Outcomes	Questions
Semester V October-November	**UNIT III** 1. **Proteins-** Essential and non-essential amino acids, Structure, function and significance of protein. 2. **Enzymes:** pH, Temperature, substrate concentration, Enzyme substrate	1. To understand the building blocks that make the compounds and to know the various bonds that partake in their formation. 2. To have an idea of their metabolism.	1.Traditional and blended teaching. Use of flipped classroom. 2.PowerPoint Presentations using CANVA 3.Recorded videos of Havard 4. PDF notes **5.FORMATIVE ASSESSMENT** by Group Discussion.	1. To have an understanding of the various components used in Biochemistry. 2. To integrate Biochemistry and their application.	***Knowledge Based*** 1.Write a note on amino acid. 2. Give significance of protein. ***Understanding Based*** 1.Explain the structure and functions of protein 2. Illustrate the feedback inhibition allosteric regulation and inhibition.
	Inhibitors: Types of Inhibitors ' Feedback Inhibition Allosteric Regulation and Inhibition'.	3. To have an overview idea on Enzymes	CIA, problem solving, quiz on Kahoot, quizzes 6. **Content management system** via MOODLE 7. **Personalised teaching Learning –** peer tutoring, pair and share.		***Higher Order Thinking Skill*** 1.Critically Evaluate the impact of pH, temperature on enzyme. 2. Analyse the structure and functioning of Protein.

SUMMATIVE ASSESSMENT- End Semester Examination and practical's

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COURSE PLAN

B.Sc. (Bio) Even Semester

2022-23

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SOPHIA GIRLS' COLLEGE, AJMER (*AUTONOMOUS*)
B.Sc. II (SEMESTER IV) Even Semester Course Plan for the session 2022-23

ZOOLOGY PAPER I- ZOO-401- Animal Physiology

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

COURSE PLAN

Semester/ Month	Unit/Topic	Concepts/ Facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
Semester-IV December	UNIT I 1. **Physiology of Digestion**: nature of food stuff, various types of digestive enzymes and their digestive action in the alimentary canal. 2. **Physiology of Respiration:**	1. various digestive enzymes and its effect on the process of digestion in mammals 2 Transport of gases and concept of partial pressure in gases	1.Traditional and blended teaching. Use of flipped classroom. 2.PowerPoint Presentations 3. Live Videos	1. Develop an idea of various physiological activities prevalent in animals with special reference to mammals.	***Knowledge Based*** 1.Give the names of various digestive enzymes found in the stomach. 2. Write a note on the mechanism of breathing. ***Understanding Based*** 1.Explain the regulation of breathing. 2. Compare the transport of CO_2 and O_2 ***Higher Order Thinking Skill*** 1.Critically evaluate the exchange of gases. 2. Small intestine play the major role in digestion. Justify.	*Knowledge Based Questions-* 60% weightage. *Understanding Based Questions* -30 weightage. *Higher Order Based Questions* -10 weightage.

	Mechanism of breathing, exchange of gases, transportation of oxygen and carbon dioxide in blood, regulation of breathing.					

Semester/ Month	Unit/Topic	Concepts/ Facts	Teaching Pedagogy	Learning Outcomes	Questions
Semester-IV **January**	**UNIT II** **1. *Physiology of Circulation*:** Composition and function of blood, mechanism of blood clotting, heartbeat, cardiac cycle, blood pressure, body temperature regulation.	1.Blood and its function 2. Heart and its working. 3.Association of the nitrogenous	1.Traditional and blended teaching. Use of flipped classroom. 2.PowerPoint Presentations	1. Analyse and understand the complexity of the various systems	***Knowledge Based*** 1.Give the functions of blood. 2. Write a note on blood pressure and heart beat. ***Understanding Based***

	2. ***Physiology of Excretion:*** Kinds of nitrogenous excretory end-products (aminotelic, ureotelic and uricotelic), role of liver in the formation excretory end products, functional architecture of mammalian kidney tubule and formation of urine, hormonal regulation of water and electrolyte balance.	waste with the habitat. 4.Formation of concentrated urine.	3. Live Videos. 4. Charts		1.Explain the principle of blood clotting. 2. Compare the aminotelic, ureotelic and uricotelic animals. ***Higher Order Thinking Skill*** 1.Critically comment on the cardiac cycle. 2. Analyse and present the complexity of the mammalian nephron.

Semester/ Month	Unit/Topic	Concepts/ Facts	Teaching Pedagogy	Learning Outcomes	Questions
Semester-IV **February/ March**	**UNIT II** 1. **Physiology of Muscle Contraction**: Functional architecture of skeletal muscle, chemical and biophysical events during contraction and relaxation of muscle fibers. **UNIT III** 2. **Physiology of Nerve Impulse and Reflex Action:** Functional architecture of a neuron 3. **Types of Endocrine Glands:** 4. **Hormonal control of male and female reproduction:** implantation, parturition and lactation.	1.Bio-physical events in muscle contraction. 2.Transport of action potential 3.Synapse 4. Glands and its associated functions 5.Male and Female hormone control	1.Traditional and blended teaching. Use of flipped classroom. 2.PowerPoint Presentations 3. Live Videos. 4.**FORMATIVE ASSESSMENT** by Group Discussion, CIA, problem solving, quiz on Kahoot, assignment. 6. **Content management system** via MOODLE 7. **Personalised teaching Learning** –pair and share, remedial classes.	1. Analyse and understand the complexity of the various systems. 2.Summarize and write about the various physiological processes	***Knowledge Based*** 1.What are H-bands and I-bands 2. Write a note on functional architecture of skeletal muscle. ***Understanding Based*** 1.Explain the principle of blood clotting. 2. Compare the aminotelic, ureotelic and uricotelic animals. ***Higher Order Thinking Skill*** 1.Critically comment on the cardiac cycle. 2. Analyse and present the complexity of the mammalian nephron.

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SUMMATIVE ASSESSMENT- End Semester Examination and practical's in April

SOPHIA GIRLS' COLLEGE, AJMER (*AUTONOMOUS*)

B.Sc. II (SEMESTER IV) Even Semester Course Plan for the session 2022-23

ZOOLOGY -PAPER II ZOO-402- Genetics and Evolution

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

Semester/ Month	Unit/Topic	Concepts/ Facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
Semester-IV **December**	**UNIT I** 1. **Mendelism**: Brief history of genetics and Mendel's work, Mendelian laws, their significance and current status, chromosomal theory of inheritance.	1.Mendel's laws of Inheritance.	1.Traditional and blended teaching. Use of flipped classroom. 2.PowerPoint Presentations 3.Numerical questions.	1. Develop an understanding on Mendelism and its significance and have an idea on mutation.	***Knowledge Based*** 1.Give the significance of Chromosomal theory. 2. Write a note on Mendel's second law of inheritance. ***Understanding Based*** 1.Explain structural mutation. 2. Compare inversion and translocation.	*Knowledge Based Questions*- 60% weightage. *Understanding Based Questions* -30 weightage. *Higher Order Based Questions* -10 weightage.

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	2. Chromosomal mutations: Classifications of chromosomal mutations, translocation, inversion, deletion and duplication, variation in chromosomal number - haploidy, diploidy, polyploidy, aneuploidy,euploidy and polysomy.	2 Mutation and its effects			***Higher Order Thinking Skill*** 1.Critically evaluate the movement of chromosome in translocation. 2. Human cannot tolerate an extra dose of gene. Justify with reference to duplication.	

Semester/ Month	Unit/Topic	Concepts/ Facts	Teaching Pedagogy	Learning Outcomes	Questions
Semester-IV **January**	3. **Gene Mutation:** Insertion, Substitution, Frameshift, Missense and Nonsense. **UNIT II** 1. **Linkage and crossing over.** 2. **Genetic interaction**: Supplementary genes, complementary genes, duplicate genes, epistasis, inhibitory and poymorphic genes, multiple gene inheritance, ABO blood groups and Rh factor and their significance. 3. **Cytoplasmic inheritance.**	1.Change occurring on DNA 2. Significance of crossing over and recombination 3.Inheritance due to multiple genes. 4.Inheritance besides the normal genetic material.	1.Traditional and blended teaching. Use of flipped classroom. 2.PowerPoint Presentations 3. Live Videos. 4. Numerical based problem solving. 5. Display of charts.	1. Deduce the significance of "crossing over" and "linkage" and various genetic interactions, cytoplasmic inheritance and sex determination	***Knowledge Based*** 1.What is frameshift mutation. 2. Write a note on epistatsis. ***Understanding Based*** 1.Explain the principle of blood group. 2. Compare the sex determination in drosophila and grasshopper. ***Higher Order Thinking Skill*** 1.Critically comment on genic balance theory. 2. Extra doses of the X-chromosome are balanced.Justify.

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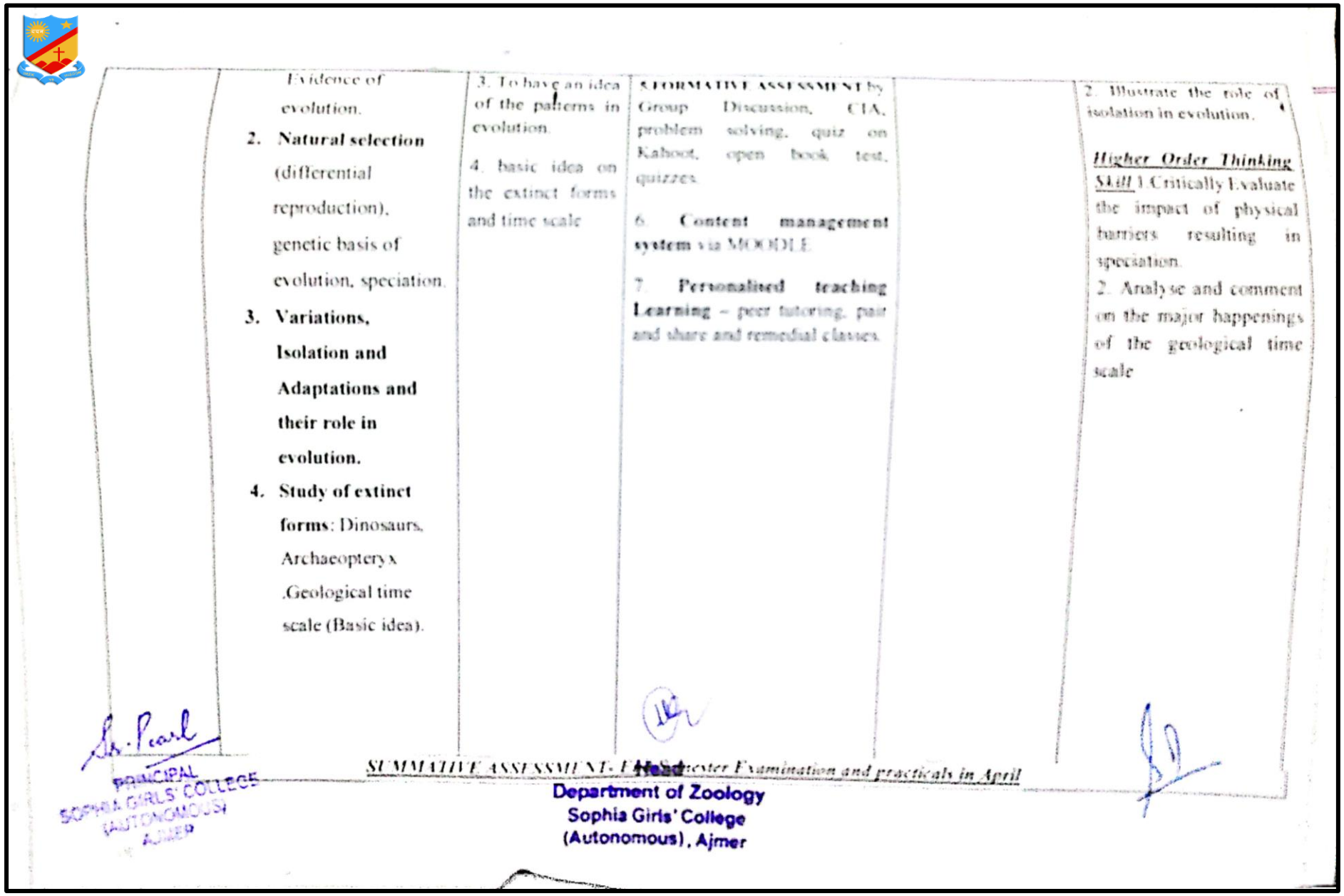
	4. **Sex determination-** types and genic balance theory, Dosage compensation	5.Role of allosomes and autosomes.			

Semester/ Month	Unit/Topic	Concepts/ Facts	Teaching Pedagogy	Learning Outcomes	Questions
Semester IV February-March	**UNIT III** 1. **History of evolutionary thought:** Lamarckism, Neo-Lamarckism, Darwinism and Neo-Darwinism.	1. To understand the evolutionary thoughts that lay the foundation for evolution. 2. Natural selection and its role in evolution.	1.Traditional and blended teaching. Use of flipped classroom. 2.PowerPoint Presentations using CANVA, google slides. 3.Charts. 4. Model display	1. To Assess various evolutionary thoughts. 2.To summarize the mechanism of natural selection, variation, isolation & adaptation	***Knowledge Based*** 1.Write a note on Lamarkism 2. Give significance of Darwinism. ***Understanding Based*** 1.Explain the Stabilizing type of Natural selection.



	Evidence of evolution. 2. **Natural selection** (differential reproduction), genetic basis of evolution, speciation. 3. **Variations, Isolation and Adaptations and their role in evolution.** 4. **Study of extinct forms**: Dinosaurs, Archaeopteryx .Geological time scale (Basic idea).	3. To have an idea of the patterns in evolution. 4. basic idea on the extinct forms and time scale	**FORMATIVE ASSESSMENT** by Group Discussion, CIA, problem solving, quiz on Kahoot, open book test, quizzes. 6. **Content management system** via MOODLE. 7. **Personalized teaching Learning** – peer tutoring, pair and share and remedial classes.		2. Illustrate the role of isolation in evolution. ***Higher Order Thinking Skill*** 1.Critically Evaluate the impact of physical barriers resulting in speciation. 2. Analyse and comment on the major happenings of the geological time scale

SUMMATIVE ASSESSMENT: End Semester Examination and practicals in April

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SOPHIA GIRLS' COLLEGE, AJMER (*AUTONOMOUS*)

B.Sc. III (SEMESTER VI) Even Semester Course Plan for the session 2022-23

ZOOLOGY PAPER II- ZOO-602-Ecology and Biostatistics

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

Semester/ Month	Unit/Topic	Concepts/ Facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
Semester-VI **December**	**UNIT I** 1. **Habitat Ecology:** Concept of Habitat and Niche – Differences between Microhabitat and Macro habitat 2. **Zonation and Characteristics and fauna of:** a) **Fresh water habitat:** Lentic and Lotic systems and Ecological classification of freshwater.	1.Concept of Habitat and Niche 2.Fresh water and Marine water zonation	1.Traditional and blended teaching. Use of flipped classroom. 2.PowerPoint Presentations 3.You Tube videos. 4. Group discussions on Environment.	1. Schematize the basic components of environment and their interaction	***Knowledge Based*** 1.Give the significance of Niche 2. Write a note on Habitat. ***Understanding Based*** 1.Explain Zonation in Marine water. 2. Compare lentic and lotic systems ***Higher Order Thinking Skill*** 1.Critically evaluate the fresh water habitat. 2. Micro and macro habitat are two wide range of existence.	*Knowledge Based Questions*- 60% weightage. *Understanding Based Questions* -30 weightage. *Higher Order Based Questions* -10 weightage.

	b) ***Marine water habitat:*** Zonation of the sea and ecological classification of marine biota					

Semester/ Month	Unit/Topic	Concepts/ Facts	Teaching Pedagogy	Learning Outcomes	Questions
Semester- VI January	**UNIT II** 1. **Population Ecology:** Interspecies and intraspecies interactions. 2. **Limiting Factors:** Liebig's law of minimum and Shelfords law of tolerance.	1.change occurring on DNA 2. significance of crossing over and recombination 3.Inheritance due to multiple genes.	1.Traditional and blended teaching. Use of flipped classroom. 2.PowerPoint Presentations 3. Live Videos.	1.Schematize the basic components of environment and their interaction. 2. Speculate the effect of	***Knowledge Based*** 1.What is Interspecific and intraspecific interaction 2. Write a note on Liegigs's law of minimum. ***Understanding Based*** 1.Explain the principle of Shelford's Law of Tolerance 2. Explain the 10% law.

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	3. **Characteristics of natural communities:** structure, composition, stratification, succession, concept of monoclimax, diclimax, polyclimax, climatic and edaphic climaxes, periodicity, ecotonal communities, ecological indicators. 4. **Ecosystem-** Biotic and abiotic factors, Homeostasis, Food chain, Food web, Trophic levels, Ecological Pyramids, Energy flow and Productivity. 5. Effect of Corona Pandemic Lockdown on environment.	4.Inheritance besides the normal genetic material. 5.Role of allosomes and autosomes.	4. Group discussion 5. Experiential learning through visits.	environment on the distribution of animals and effect on human.	***Higher Order Thinking Skill*** 1.Critically comment on Energy flow. 2. Critically comment on biotic and abiotic factors

Semester/ Month	Unit/Topic	Concepts/ Facts	Teaching Pedagogy	Learning Outcomes	Questions
Semester-VI **February/ March**	**UNIT III** 1. Mean, mode, median. Frequency distribution, graphical presentation 2. Coefficient of correlation, t-test and Chi square test 3. Standard deviation	1. Bio statistical tools and its basic understanding	1.Traditional and blended teaching. Use of flipped classroom. 2. Numerical **3.FORMATIVE ASSESSMENT** by Group Discussion, CIA, problem solving, quiz on Kahoot, numerical test, quizzes. 4. **Content management system** via MOODLE 5. **Personalised teaching Learning** – peer tutoring, pair and share and remedial classes, class test.	1. Justify the importance of statistical analysis in biology	***Knowledge Based*** 1.What is mean 2. Write a note on standard deviation ***Understanding Based*** 1.Explain the principle of t-test 2. Compare the median and mode. ***Higher Order Thinking Skill*** 1.Critically comment on non-parametric test 2. Analyse and justify that graphical representations make presentations easy and readable.
SUMMATIVE ASSESSMENT- End Semester Examination and practicals in April					

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